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# Trading and Investment: Analysis and Development of a Trading System for Currencies

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**Trading and Investment:  
Analysis and Development of a Trading System for  
Currencies**

*An Interactive Qualifying Project*

*Submitted to the Faculty of*

WORCESTER POLYTECHNIC INSTITUTE

*In partial fulfillment of the requirements for the*

*Degree of Bachelor of Science*



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Date: May 4, 2015

Report Submitted to:

Professors Michael Radzicki and Hossein Hakim of Worcester Polytechnic Institute

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## Abstract

The purpose of this IQP is to use the basics of trading and investment and apply it scientifically to create a profitable system made up of several systems. The project consists of the creation of three individual trading systems with their own set of rules. These individual systems were analyzed for current and future profitability in the market leading to the creation of a system of systems. Of the three individual systems two of them were trending systems and one was a support and resistance system, which led to system of systems that uses both trending and support and resistance methods in order to trade.

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# 1. Introduction

In today's world many people work hard to in order to ensure their financial security. In order to achieve this they save their money when possible and spend wisely when they have to in order to maximize the use of the money they have, but there is a limitation to what saving and spending money wisely can do. Investing on the other hand has the potential to have a much greater impact on a person's financial security. Investing is to put some money into something in order to generate a profit out of it. Some people do this by starting a business, or purchasing land, other's trade stocks in the stock market or currencies in the forex market.

One of the biggest reasons a person loses money on an investment is due to the inadequacy or lack of planning or research about the investment. Without knowing everything needed to be known about the asset a person is investing into, leaves the chance of the investment being a success to be the same as winning a game of roulette. A proper investment requires proper planning and extensive research on the investment to ensure the chances of success are greater than a bet at a casino.

There is a vast amount of information on the subject of investing freely available to all in the form of books, internet forums, lectures, and scholarly journals with all of this information it is possible for every person to learn about the basics of investing in the stock or forex market like transaction fees and simple rules to follow when trading. With the advent of online trading the barrier to enter is lower than ever before, making it possible to trade with as little as \$50. With that little of money to invest it is even more imperative to trade wisely. Making a personal strict set of rules on how to trade an asset and following them unconditionally is the basis of trading. These set of rules are often called a trading system and can be either automated by a computer or manually followed.

## 1.1 Project Description

The purpose of this project was to develop successful trading systems. In order to achieve this, the group started by first learning the basics of trading and investment. This was done by becoming acquainted with the terminology involved in trading, to learning about the assets traded and finally learning about the basic tools to trade, indicators and simply systems. For majority of the duration of the project the group developed several trading systems. Once the systems were finalized by the use of back testing the systems on past data these systems were analyzed via scientific means to determine the consistency of success of the systems. These means were determining the expectancy, expectunity, system quality of the system to see how the systems worked on a current list of trades, and applying Walk Forward analysis and Monte-Carlo simulations on the systems to determine how well the systems would work in the future.

## 2. Background

This section will contain the basics of trading and investment, including terminology, asset classes, an introduction to Tradestation, and an introduction to indicators and strategies.

### 2.1 Terminology

- Moving average (MA) - This is a widely used trend-following indicator in technical analysis. It helps smooth out price action by filtering out the "noise" from price fluctuations. There are two basic moving averages simple and exponential. This type of indicator is also a lagging indicator since its values are based on passed data. To do a simple average you need the closing of the bars and a length. This also means the longer the length is the greater the lag is.
- Simple Moving Average (SMA) - To calculate a simple moving average you need the closing of a number of bars and a length for the moving average. An example is below using a length of 5.
- Exponential Moving average (EMA) - The exponential moving average is another moving average, but this MA gives more weight (value) to more recent data. This type of MA reacts faster to recent price changes than a SMA and by extension this means it lags behind less than the SMA using the same length.
- Support line - This is the price level which a stock or currency pair has had difficulty falling below. It is thought as a level at which a lot of buyers tend to enter the stock or currency pair. It is also known as the support level.

Table 2.1: Simple Moving Average Example

Day	Closing Price	5-day SMA	Values used to Calculate SMA
1	10	-	
2	9	-	
3	8	-	
4	9	-	
5	6	8.4	Days 1-5
6	4	7.2	Days 2-6
7	7	6.8	Days 3-7
8	6	6.4	Days 4-8
9	5	5.6	Days 5-9
10	8	6	Days 6-10

- Resistance line - This is the price level which a stock or currency pair has had difficulty breaking through. The more time the stock or currency pair has had trouble breaking through this line makes the line more important.
- ADX - Average Directional Index, A term used to determine the strength of a trend, generally above 20 indicates a trend exists, above 40 indicates a strong trend. It is an exponential moving average of two other indicators, the DX+ and DX- which use the relationship between the change in highs and lows to determine the strength of the positive or negative trend.
- Trend - The general direction of a market or of the price of an asset. It can vary from short in duration to long term. If a trend is identified it can be very profitable to trade with the trend.
- Bollinger Bands - A technical trading tool created by John Bollinger in the early 1980's. Their purpose is to provide a relative price for high and low. This is done by a set of three curves drawn by their relation to the asset's price. The middle band is usually a simple moving average of the asset. While the upper and lower bands are just x standard deviations away from the middle band. [1]
- Pip - The smallest price change that a given exchange rate can make. For most currencies a pip is 0.0001. For other pairs like ones paired

with the Japanese Yen the pip is 0.01.

- Base Currency - The first currency quoted in a currency pair in the forex market. It is also the currency you are buying when you buy a currency pair. For example for USDCAD the base currency is the American dollar.
- Quote Currency - The second currency quoted in a currency pair in the forex market. It is also the currency you are paying with when you buy a currency pair. For example for USDCAD the base currency is the Canadian dollar.
- Currency Pair - A set of two currencies together which are traded in the forex market. The first pair is the base currency, and the second is the quote currency. The pair itself shows how much of the quote currency is needed to purchase one unit of the base currency.
- Lot - In the financial market it represents the standardized quantity of a financial instrument as set by an exchange or other regulatory body. In terms of stocks it is the number of shares you purchase in one transaction. In forex it equates to 100,000 units of the base currency.
- Curve-Fitting - The act of optimizing a trading system exactly to a specific set of data such that it performs extremely well on that specific set of data. Yet when the system is applied to a different set of data the system performs completely differently, usually for the worse.
- System - A set for rules/parameters that tell when the trader when to enter and exit for a given asset. These rules can either be in the mind of the trader or a coded trading system.

## 2.2 Introduction To Asset Classes

When trading, investors deal with asset classes which are groups of securities that behave similar to each other in the marketplace and follow the same laws and regulations. [2] This section will give a detailed looked at the four main asset classes: stocks, bonds, commodities and currencies. In addition it will talk about how they are traded since each of the asset classes is traded slightly different from each other, which affects the strategies used while trading them.

## 2.2.1 Stocks

The first of the asset classes, a stock, is a type of security that indicates ownership of a portion of a company and signifies a claim to a part of the business's earnings. In stocks there are two types: common and preferred. The difference between common and preferred stocks being that common stocks give the stockholder the right to vote at shareholder's meeting. While preferred stock owners generally cannot vote at shareholder's meetings they do however have higher claims on assets and earnings than the common shares such that they receive dividends before common shareholders. [2] The main stock markets in the United States are the New York Stock Exchange and the NASDAQ which are the places where stocks are primarily bought and sold and it opens at 9:30 AM and closes at 4:00 PM Eastern Time.

### 2.2.1.1 How Stocks Are Traded

Stocks are typically traded on exchanges, which can either be a physical location or electronically through programs, in the primary market. The prices are determined in these marketplaces and are affected by forces categorized as fundamental factors, technical factors, and market sentiment.

Fundamental factors, at their core, are hard data, which includes various economic factors such as interest rates, ratios, etc., which are all used to evaluate the security's value. While technical factors include the historical performance of stocks and markets in order to predict the future movement of the stock. Finally, market sentiment is defined to be the overall attitude of investors towards a stock or the overall market, thereby rooting it deeply into psychology.

Since human emotions can defy logic and expectations, the accurate prediction of markets becomes a near impossible task, defying both fundamental and technical analyses. Using a combination of those three factors, investors have two ways of trading stocks. They can decide to either take a long or short position depending on the results of their examination of the three factors. If the investor believes that the market will go into a downturn, he may decide to short a stock. Shorting a stock means that an investor borrows a number of shares of the stock and sells them. The investor later covers the short by buying back all the borrowed shares. If the market decreased as expected, the investor makes a profit, however if the market does not decline, but rather increases, the investor incurs a loss. Shorting a stock is considered



to be quite risky since the most the investor can hope to make is the price at which he sold the shares since the price of a share cannot go negative, but can theoretically lose an infinite amount of money because there is no upper-bound to prices. The second way an investor can get into the stock market is to take a long position. This means that the investor purchases a number of shares, with the expectation that the market will increase.

Once the investor has chosen whether or not to go long or short, he must decide which market order to place. There are two basic types of orders that are used to trade the stock, and they are market orders and limit orders. The first kind is an order to buy or sell immediately at the best available price. These orders will not guarantee the price, however they do insure that the order is executed immediately when there are shares available to be bought. The second kind of order is the limit order. A limit order sets the minimum or maximum price at which the investor is willing to buy or sell. It is possible that order may take longer to execute since the market may never reach the price at which the limit order was set. While the timing of the order is important to consider when deciding to choose between a market or limit order, it is also important to note that market orders are typically cheaper than limit orders due to lower commission costs.

In addition to these two main orders, there are additional restrictions that an investor may want to impose on the trades. The most useful of these additional orders is the stop order, commonly known as the stop loss. A stop loss is an order that terminates a trade at the best available price if the losses incurred exceeds certain predetermined amount. While this can be useful in preventing huge losses, it can also stop a trade that might have been profitable if it had been allowed to remain open. An investor can also choose different time frames on which to trade, such as intra-day (5 minutes, 30 minutes, 60 minutes, etc.), daily and weekly. In general, trades initiated during longer time frames can incur greater losses, as well as larger gains due to the larger price shifts. [3]

### 2.2.2 Bonds

The next asset class, the bond, is a debt investment in which an investor lends money to a corporation or government, called the face value, for a set period of time at a fixed interest rate in exchange for coupons that are paid at designated intervals until the maturity date, at which the company pays back the amount lent to the investor. Bonds are primarily used by companies

in order to raise capital for expansion into new markets, acquisition of new machinery, etc. Governments also issue bonds in order fund their projects as well. The most commonly known of these government bonds are wartime bonds in order to raise capital for war. [2]

#### **2.2.2.1 How Bonds Are Traded**

Bonds are mostly traded in the secondary market, in which investors purchase securities or assets from other investors, due to the greater number of issuers involved and the bond's diverse nature. These differences include the maturities and yields making trading in the primary market more complicated. In addition, it is more difficult to list the current prices of the bonds, which further complicates the process of possibly trading in the primary market since bond prices are primarily affected by changing interest rates and credit ratings and the trade time between issues can typically last months or weeks. [2]

### **2.2.3 Commodities**

Commodities are the third asset class. Commodities itself is divided into four categories: energy, metals, livestock and meat, and agricultural. They are interchangeable with other commodities of the same type so a kilogram of gold from one company is same as a kilogram of gold from another. Commodities can include any good exchanged during commerce or goods traded in the commodity exchange. [2]

#### **2.2.3.1 How Commodities Are Traded**

Commodities are traded using futures contracts. A futures contract standardizes the minimum quantity and quality needed to initiate trade. These contracts are often used with hedging and forward contracts to effectively lock the price of the commodity, thus allowing a company to avoid some of the volatility in the market. [2]

### **2.2.4 Currencies**

Finally, currencies are generally accepted forms of money issued by a government and circulated within an economy. They are used as a medium of exchange between for goods and services and are the basis of trade.

#### 2.2.4.1 How Currencies Are Traded

Currencies are traded on the forex market. Similar to stocks, an investor can take long and short positions and can use market and limit orders. However, unlike stocks, futures, or options, currency trading does not take place in a regulated exchange and it is not controlled by any central authority. All members of the market trade with each other based on credit agreements, with no group of people arbitrating disputes that may arise. Another difference between the stock market and the forex market is that the investor will always be long in one currency and short in another since currencies are traded in pairs. [2] In addition currencies are purchased in lots in order to standardize trade. It allows investors to know how many units they are purchasing and can more easily assess the price per unit. There are three main kinds of lots and they are: micro, (1,000 units) mini (10,000 units), and standard (100,000 units). Also, in order to trade these large amounts of units, leverage is applied to the market. Leverage simply put is a loan provided to the investor by their broker usually given in amounts of 50:1, 100:1, or 200:1. This means that the broker will allow the investor to trade up to 200 times the actual cash the investor wishes to trade. The leverage amounts will vary depending on the broker and the size of the position being traded. Typically, the max leverage is 50:1, however it is possible to have higher with lower capital. [2]

### 2.3 Introduction To TradeStation

TradeStation is an electronic trading platform that users pay for in order to analyze the financial market through various means such as live data, charts, indicators, etc. It also allows users to enter and manage market orders and positions manually as well as automatically, using a built in programming language called EasyLanguage. This language allows users to create strategies, indicators, and other tools designed to making the trading process easier. TradeStation also has a database which includes examples of code to help traders who are not good at coding. A trader can decide to create a simulator account in order to back-test code, manual strategies, and ideas, etc. In order to test their trading system before they use it on the real market, this is useful in order to avoid using a bad trading system.

## 2.4 What are Indicators

An indicator is a tool used by traders to assist with the detection of trends or market behaviors. Most indicators attempt to identify and quantify overbought and oversold, however they tend to lag behind the market because they rely on historical data to make the calculations. Indicators also tend to be trend following, which means that while the indicators will help a trader obtain a position in the trend, it will not be able to get a position at a turn of the market. [4] Even with these flaws, indicators can still be useful tools if they are used in conjunction with, and to construct, trading strategies. [3]

### 2.4.1 Examples Of Indicators

- Simple Moving Average (SMA): A simple moving average is a type of average which is calculated by adding the closing prices of the last "n" periods and dividing by the number of periods. [5]



Figure 2.1: Example Of A Simple Moving Average Indicator

The cyan line in the graph represents the SMA. One can see that the SMA follows the general trend of the market, but lags behind by a bit.

- High and Low of a day: This indicator simply draws lines at the highs and lows of a market.



Figure 2.2: Example Of A Day High/Low Indicator

This graph shows the lines drawn by the indicator, with red representing the highs and blue representing the lows.

- Bollinger Bands: Bollinger bands are indicators of market volatility.



Figure 2.3: Example Of A Bollinger Band Indicator

Bollinger bands, as shown by this graph (represented by the red and cyan curves) move apart when the market increases or decreases and contracts when the market stabilizes around a price. Bollinger bands

act as dynamic support and resistance levels, with the market bouncing back and forth inside the bands. A move can be detected when the bands begin to squeeze together and the bars begin to break out above or below the bands. [5]

## **2.5 What are strategies**

A trading strategy is one of, if not the, most important section to trading successfully. A trading strategy is, in its most general form, a set of rules for when to enter or exit the market. Trading strategies allow for a trader to mathematically verify the effectiveness of his or her strategy, as well as to determine how much loss will, barring extraneous circumstances, occur, as well as project profit margins and minimize losses by knowing what normal losses look like. A strategy is generally composed of entry and exit rules. [3]

### **2.5.1 Entry Rules**

An entry rule is a rule that tells a strategy to enter the market, this can be as simple as two moving averages crossing, or a complex decision predicated on multiple simpler rules. While complexity can add accuracy, sometimes it is considered better to have a weaker rule, as if you arrange your strategy to be completely sure, it may never enter over the entire time you are trading. Generally speaking, these rules compose the "predictive" section of the strategy. [3]

### **2.5.2 Exit Rules**

Exit rules are also very important, although sometimes less focused on as compared to entry rules. Exit rules cover many situations and concerns, such as maximizing profitability, minimizing losses, and controlling risk.

Exit rules maximize profitability by allowing the strategy to end the trade when it appears that a reversal is probable. Two simple versions of this are exiting when your entry rules say to enter in the opposite position, or to exit after a profit has decreased to a certain percentage of the maximum profit.

Exit rules minimize loss by exiting positions that have been shown to be un-winnable, based on analysis of previous trades. Every strategy will inevitably have some losing trade, and it is important to have a good exit

rule to leave it once it has reached that point, rather than wait for it to continue dropping, in the *hope* that it will eventually come back. One of the simplest exit rules for this purpose is a flat stop loss set from the starting price of every trade.

Finally exit rules combat risk by allowing the user to manually set how much he or she risks on a given trade, traditionally implemented thru a manually set stop loss on the position. [3]

### 2.5.3 Example of simple strategies

One of the simplest trading strategies is the moving average crossover strategy.

```
LongAverage = average(close, LONG_LENGTH)
ShortAverage = average(close, SHORT_LENGTH)
```

The strategy constructs two moving averages, in the above snippet *LongAverage* and *ShortAverage*, with average lengths *LONG\_LENGTH* and *SHORT\_LENGTH* respectively. The strategy then proceeds to enter in a long position if the shorter average crossed over the longer one (indicating sustained upward movement), or in a short position if the longer crosses over the shorter (indicating the opposite)

```
if ShortAverage crosses over LongAverage then
// LONG
if LongAverage Crosses over ShortAverage then
// SHORT
```

As can be seen, this strategy has two entry conditions, one for shorts and one for long, as well as two hidden exit conditions. One feature of the Tradestation environment is that when a strategy enters a trade, it automatically closes any trades that are "opposite" to this entry. Therefore the entry condition for long positions serves as the exit to the long position, and vice versa.

## 3. Methodology

In all walks of life, having strategies and plans tends to be superior to acting on a whim. Normally, a person can approach a topic, and generate a strategy on the fly, as most problems are suitably divorced from emotion for human's irrational instincts to take the wayside, or suitably grounded in physical fact to make emotion based solutions instantly fail. However, trading and investing is both inherently interlinked with emotion, as one must barter with one's future, as well as having incredibly high costs of failure. To develop such a strategy for trading, one must look past emotion and into the fields of statistics and mathematics.

### 3.1 Design

Most trading and investing systems work very well under certain circumstances, however one may never know if your system will work on a given year on a given asset until said year has passed. We decided to attempt to hybridize strategies together in order to improve robustness and allow our strategy to adapt to changing market conditions with minimal user input.

One of the classic ways to achieve this effect is by the use of decision trees. A decision tree allows the system to cleanly approach complex decisions based on multiple true-false statements. Our strategy utilizes a small one in order to handle differing situations, such as if it has a position in the market, or whether or not the market is trending.

### 3.2 Optimization

Another key factor in our strategy development was the proliferation of customize-able "variables" the Tradestation platform allows such things to



be automatically fit to previous data, and as such the best values for strategy evaluation to come to the fore. A important concern for us while using this technique was that it is possible to over-fit the data set, which artificially inflates result numbers.

### 3.3 Testing

After system optimization it is important to utilize a test or validation data set in order to determine if the data has been over fit and what the system should accomplish under real conditions. In most cases, picking a data set after or before the utilized example works in order to find over-fit parameters. This is further assisted by running walk forward analyses, in order to ensure that the strategy didn't merely, "get lucky" during the back-testing interval, which would twist the results.

### 3.4 Analysis

Two analysis techniques were used beyond the built-in TradeStation optimizer, Monte-Carlo analysis and position size optimization. Monte Carlo analysis is a technique where the trades the system generated are analyzed by introducing randomness, in order to determine how the system can be expected to generate how the system will perform under future randomness by generating statistical models. The other external analysis technique was position size optimization, in order to determine how to best trade the system. [6]

## 4. Results

### 4.1 Overbought And Oversold System

One of the systems made by the group is the overbought/oversold trading system. It is a system in the directionless category, such that the way it trades is based on support and resistance levels. Compared to other support and resistance systems the way it enters trades are quite different.

#### 4.1.1 Development

In the beginning this system was a manually executed system that depends on the user to decide if a support or resistance level has been reached. In addition to that the system waited until an exponential moving average agreed with the idea of the asset being at a support or at a resistance level after that it would enter a trade looking for 100 pip profit while risking 50 pips. In the beginning the system using this set of rules worked due to luck but then quickly started to lose 100% of the trades. The first thing that changed was modification of the exit rules by aiming for a lower profit or risking more and both times no change in the result occurred leading to more broader changes.

The first of these broader changes was based on the idea that the group member making the system was correct in his assessment of support and resistance levels and from that the part of the strategy require the exponential moving average was removed, due to that that it was delaying the entry of the trade. Even after this change occurred the system was still incapable of being consistently profitable. Thus it became aware that determining support and resistance levels without any type of indicator is not possible.

Then by testing the available methods of determining support and resistance the way of calculating overbought and oversold used in the system

currently was decided upon based on two criteria. The first being the way it calculates overbought and oversold was depending on only a certain number of bars back, this made the calculations more reliable in cases where outliers events occurred just outside of the number of bars used. The other criterion is that the group felt more confident in this method of overbought and oversold than the use of Fibonacci levels.

After deciding upon the method used for overbought and oversold three final changes were made to the system. The first was that the system was now automated using EasyLanguage in order to ensure the rules were being followed. Second that the profit levels and maximum loss amount for exit conditions were changed from being in pips to being in dollars due to not wanting to make extra code to make it work for currency pairs where a pip is 0.0001 and pairs were it is 0.01. The last change made was the limiting of consecutive long and short orders in order to make the system more reliable. These last two changes are talked about more in the optimization section of this system.

#### **4.1.2 Inputs**

- Barsback - Used to calculate support and resistance levels
- Overbought Level - Used for short entry condition
- Oversold Level - Used for short entry condition
- Targetprofit - Value Used for Max Profit in Dollars per Trade
- Maximumloss - Value used for maximum loss in dollars per trade
- NumberofShares - Value used to trade that many shares per trade

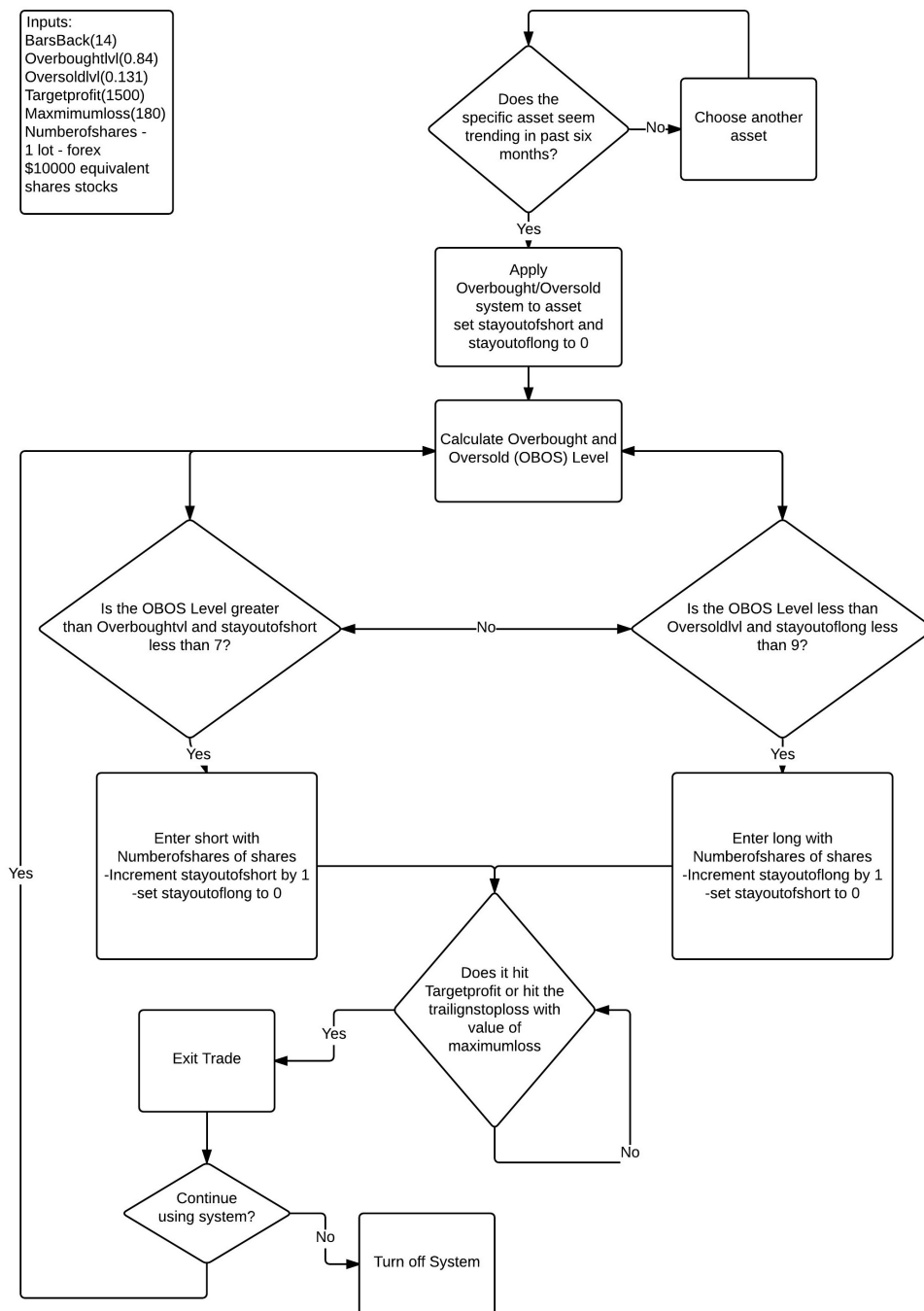


Figure 4.1: Flow chart representation of overbought oversold strategy

### 4.1.3 Rules

#### 4.1.3.1 Choosing The Right Asset

The first rule that must be followed in the Overbought/Oversold System is that it should only be applied to an asset that is not guaranteed to be trending. To do this some steps must be following for stocks and currency pairs. For currency pairs there is one key area to look at in order to avoid trading a specific pair that is currently on trending period. This is looking at the strength of the individual currencies in the pair during the past six months using a time frame higher than what the system will be trading on using a currency strength indicator. From this indicator it is imperative to only trade currencies pairs where both the strengths of the currencies do not change dramatically. In figure 4.2 one can see a currency strength indicator in action from October 2014 to March 2015. Based on the rule set shown the best pair would involve white and blue which correspond to The United States Dollar and the Great British Pound. On the other hand a pair of the British Pound and the Canadian Dollar which is green in the figure would have work up until mid-January which at that time one would turn this system off from trading GBPCAD.

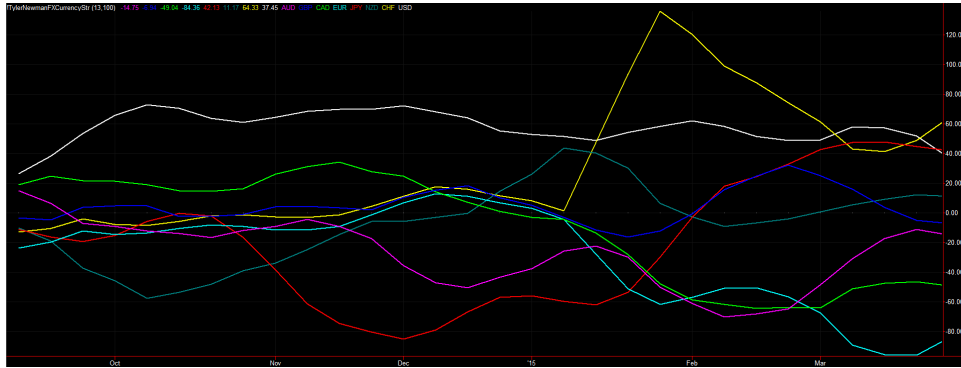


Figure 4.2: Currency Strength Indicator

Since there is such an order of magnitude more stocks than there are major currencies the method for currencies cannot be used for stocks. Instead to determine if the stock is acceptable for use for this system one would look at the value of the stock in a chart over the past six month on a higher time frame than the one that will be used for trading where an uptrend is defined as a \$20 increase in price of the stock since the beginning of the six months and a downtrend as a \$20 dollar decrease in the price of the stock.. If there is a clear uptrend or downtrend during the whole six months then that specific stock should not be used. If there is not a clear trend than that stock can be used.



Figure 4.3: AAPL Stock October 2014-March 2015



Figure 4.4: AMD Stock October 2014-March 2015

The two figures above show the stocks of Apple (AAPL) and Advanced Micro Devices (AMD) over the six month period from October 2014 to March

2015. Based on these two stocks Apple would not have this system applied to it since Apple would be better suited for a trend following system. On the other hand AMD would be a suitable candidate for this system.

#### 4.1.3.2 How It Calculates Overbought / Oversold

The first of the calculations needed are the two support levels. The first support level is set equal to the lowest of the lows of the past x bars, where x is half of the input barsback. The second support levels is set equal to the lowest of the lows of the past x bars, where is equal to the input barsback.

Table 4.1: Example of Overbought / Oversold System Barsback

Bar Number	1	2	3	4	5	6 (Current)
High of Bar (\$)	10	12	13	17	9	14
Low of Bar (\$)	5	3	4	4	5	4

Using the table above as an example using Barsback to be 6 the first support level would be found using the bars in yellow while the second support levels would make use of all the bars in the table.

Support level 1 = \$4

Support level 2 = \$3

Next the resistance levels would be calculated similarly to the support levels with the key difference being that their values would be set equal to the highest of the highs instead of the lowest of the lows. Using the same example as in the support level case the following would be the resistance levels.

Resistance level 1 = \$17

Resistance level 2 = \$17

After calculating the support and resistance levels, the distance of the current bar from each support and resistance level needs to be calculated by subtracting their values from the current price then dividing that value by the current price gets the distance values for each level. Using a current

price of \$8 and the example resistance levels above would make the following distance values.

$$\text{Distance value of Support Level 1} = \frac{8 - 4}{8} = 0.5$$

$$\text{Distance value of Support Level 2} = \frac{8 - 3}{8} = 0.625$$

$$\text{Distance value of Resistance Level 1} = \frac{8 - 17}{8} = -1.125$$

$$\text{Distance value of Resistance Level 2} = \frac{8 - 17}{8} = -1.125$$

The final two calculations before the overbought and oversold calculation are to take the range of the support and resistance values. The first range is equal to the sum of the absolute values of the first resistance and support distance values. The second range value is calculated the same, but using the second support and resistance distance values.

$$\text{Range 1} = |0.5| + |-1.125| = 1.625$$

$$\text{Range 2} = |0.625| + |-1.125| = 1.75$$

Finally the overbought and oversold level can be calculated. This value named *OBOSlevel* is equal to half of the sum of the absolute value of first support distance value divided by range 1 and the absolute value of second support distance value divided by range 2.

$$OBOSlevel = \frac{\frac{|0.5|}{1.625} + \frac{|0.625|}{1.75}}{2} = 0.3324$$

### 4.1.3.3 Entry Rules

#### 4.1.3.3.1 Long

There are two entry conditions for a long trade. The first is that the *OBOSlevel* must be greater than the *Oversoldlvl* input which is set by the user. The second condition is that the counter *stayoutoflong* is less than nine. This is in order to minimize the number of consecutive same position trades. When these conditions have been met the system will enter long with the amount of shares that is equal to the input, *numberofshares* and it will increment the *stayoutoflong* counter by one and reset the *stayoutofshort* counter to zero.



#### 4.1.3.3.2 Short

There are two entry conditions for a short trade. The first is that the *OBOSSlevel* must be less than the *Overboughtlvl* input which is set by the user. The second condition is that the counter *stayoutofshort* is less than seven. This is in order to minimize the number of consecutive same position trades. When these conditions have been met the system will enter short with the amount of shares that is equal to the input, *numberofshares* and it will increment the *stayoutofshort* counter by one and reset the *stayoutoflong* counter to zero.

#### 4.1.3.4 Exit Rules

In this system there are two ways to exit a trade One for a loss and one for a profit, the profit exit condition is that if it hit the profit target for the trade which is designated by the by user as *targetprof*. To exit with a loss is if the trade hits the *dollartrailingstoploss* which is set to the input of *maximumloss*.

### 4.1.4 Expectancy and Expectunity

One of the first analysis techniques for a system is to calculate the systems expectancy and expectunity. Expectancy is number that corresponds to the profit or loss per dollar risked per trade. In order to calculate it you need to have a list of trades of the system you want to analyze then expectancy is calculated by the following formula where n is the number of trades in the list.

$$Expectancy = \sum_{i=0}^n \frac{Profit_i / Loss_i}{\text{Average Losing Trade}}$$

The expectancy of the overbought/oversold system was calculated to be 1.6945. The expectancy being a positive number is a good thing due to the fact that it means that for every dollar risked it should gain \$1.69 dollars back per trade. This by itself is not a factor of a successful system so expectunity is also calculated.

$$Expectunity = Expectancy * \text{Number Of Trades Per Year}$$

Expectunity is the profit or loss per dollar risked per year. The expectancy for the overbought/oversold system was calculated to be 84.23. This means that for every dollar risked per year there should be a return of \$84.23.

Overall both the expectancy and expectancy values showed indications that the overbought/oversold trading system is a good system. But these two criteria are only a few of the analysis techniques for a system and a good system is one that passes them all.

#### 4.1.5 System Quality

The system quality calculation is another technique to assess how well a system is. System quality itself is a dimensionless value that shows the product of the average winning trade and the square root of the number of trades divided by the standard deviation of the winning trades.

$$\text{System Quality} = \frac{\text{Expectancy} * \text{StdDev}(\text{Number Of Trades})}{\text{StdDev}(R)}$$

$$R = \frac{\text{Profit Or Loss}}{\text{Average Losing Trade}}$$

The bigger the number for system quality shows how good the system is. For the overbought/oversold system the system quality was found to be 2.874.

#### 4.1.6 Monte-Carlo Analysis

Monte Carlo simulations are another analysis technique in order to determine if a system is good or not. To simply put Monte Carlo simulations in trading takes all of the trades a systems makes, and randomly sequences them and then calculates the rate of return and the max drawdown. This process is then repeated many times to see how the system works in the best and worst of times. One of the big reasons this is useful is that using the data made by the Monte Carlo simulations a 95% confidence interval can be created for the system. Figure 4.6 shows the 95% confidence interval along with the actual results of the trades. From its analysis it can be said that it is 95% certain that the rate of return will be at least 3.265% and the maximum drawdown will be at most 1.067% of the initial capital. This shows good promise since a return of around 3% is a great number in trading.

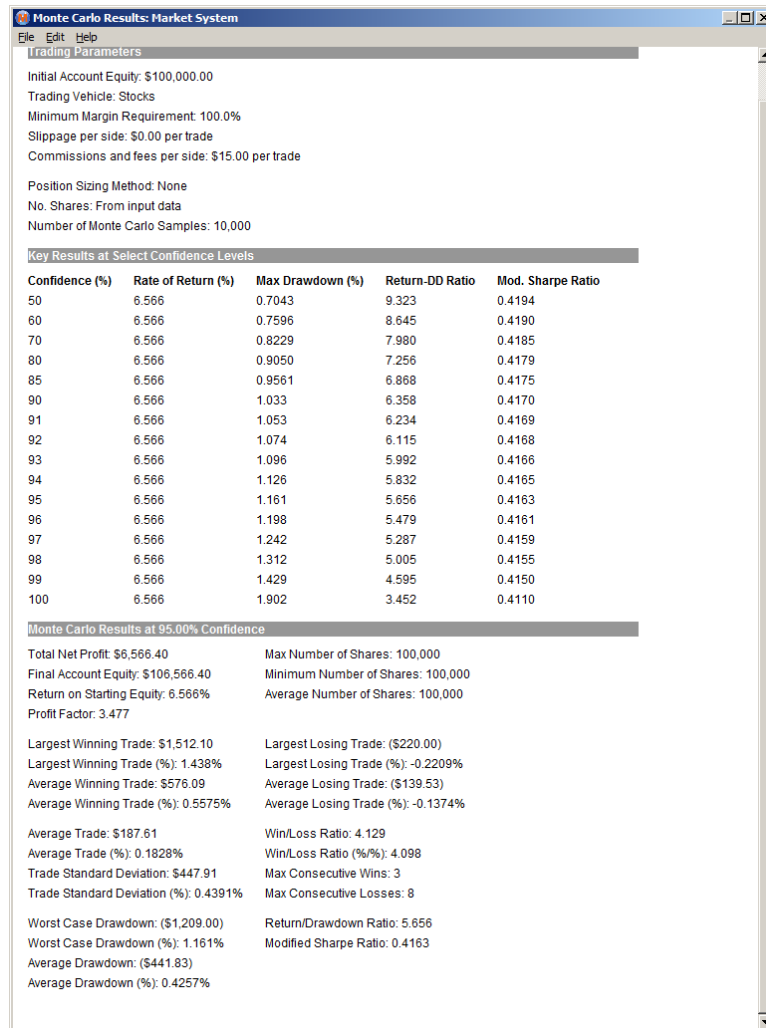


Figure 4.5: System Confidence Levels

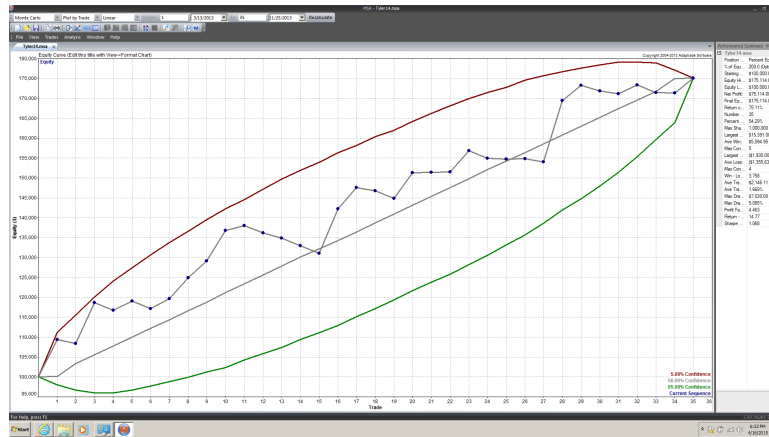
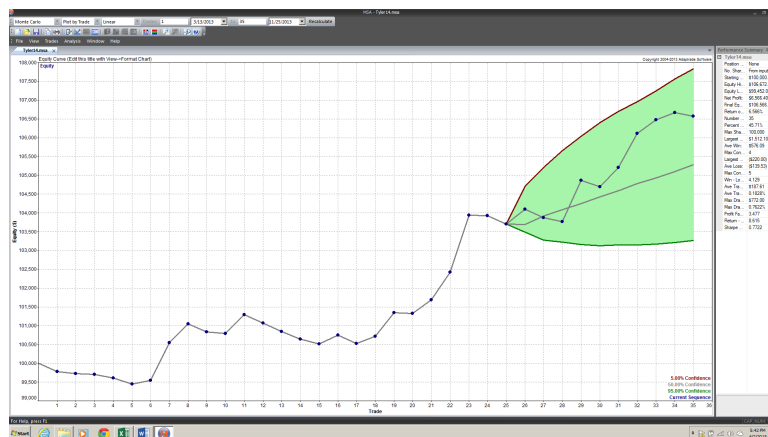


Figure 4.6: System 95% Confidence Level Equity Graph

It is also possible to make a 95% confidence interval for future trades. It does this by running the montecarlo simulations on a fraction of the trades you have down then projecting those results on the future results to see how it occurs. A sign that the system is good is one where the line stays inside the 95% interval which shows that it is operating normal, while if it is outside of the 95% there is an indication of something bad in the system. This type of interval can be seen below which showed that it stayed within the confidence interval. This is a good result since future trades should act like this too.



Lastly using Monte Carlo simulations can be used to get optimal position sizing. It does so by using a technique where as you win money you risk more and as you lose money you risk less. Then it uses the list of trades and optimizes the position sizing for the parameter selected. Using this technique the system was optimized for position using net profit and return to drawdown ratio. The results for the optimized position sizing via the net profit are shown in the figure below. It shows that the optimal position size when trying for the best return to drawdown ratio is 200% of the initial equity per trade. By doing so it expects \$75,114 of profit with this position sizing. When it was optimized for the best return to drawdown ratio as shown in figure 4.8 it showed the same result of 200% of the initial equity per trade. This shows a good sign in the fact that that using this position size in trading should be the best for net profit and the best for keeping my return rate higher than my maximum drawdown per trade.

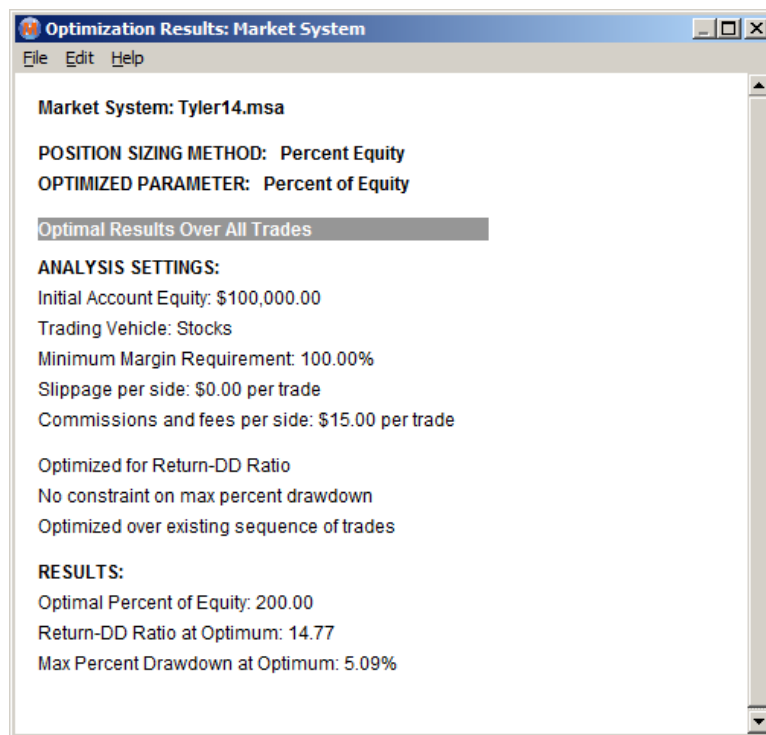
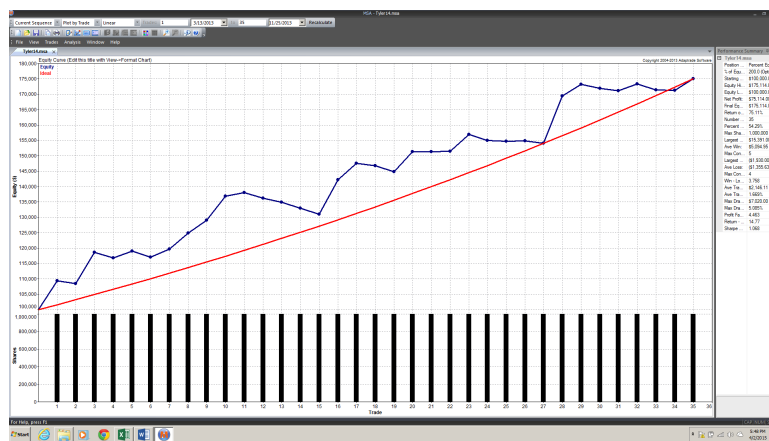
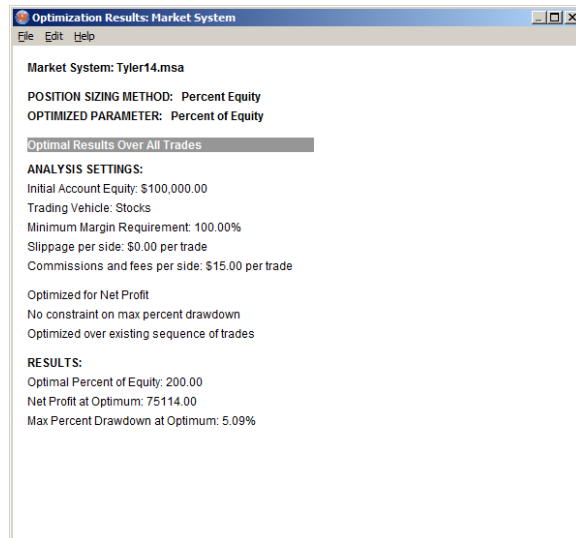


Figure 4.8: Result of Position Size optimization via Return-drawdown Ratio



### 4.1.7 Walk Forward

Walk Forward analyses are used to see how a system will work with unknown data with its parameters changing in order to see if the parameters are good for an extended period of time. In the figure below there is a 6x3 rectangle of passes. This shows that overall by walk-forward analysis that the system will be profitable in the future and its parameters will not need to be changed.

OOS% \	5	10	15	20	25	30
10	PASS	PASS	PASS	PASS	PASS	PASS
15	PASS	PASS	PASS	PASS	PASS	PASS
20	PASS	PASS	PASS	PASS	PASS	PASS
25	PASS	FAILED	PASS	PASS	PASS	PASS
30	FAILED	FAILED	PASS	PASS	FAILED	FAILED

Figure 4.11: System Walk Forward Cluster Result

Walk-Forward Analysis Results : OOS=15% WFRuns=10

Symbol: GBPCAD\_Daily

Strategy: llastCtermGBPCAD

	Test Criteria	Result	Comment
1	Overall Profitability	Pass	Total Profit > 0. System is likely to perform profitable on unseen data
2	Walk-Forward	Pass	Walk-Forward Efficiency >= 50%. System is likely to at a rate between 50-100% of those achieved during
3	Consistency of	Pass	50%+ of walk-forward runs were profitable. System is likely to be successful in future.
4	Distribution of	Pass	No individual time period contributed more than 50% of Total Net Profit.
5	Maximum	Pass	No individual run had a drawdown of more than 40% of initial capital.
	OVERALL RESULT	PASS	

Figure 4.12: System Walk Forward Individual Result

A look at the walk forward result highlighted in blue shows the figure above shows what is needed in order to pass a walk forward. First and most obvious is to generate a profit, next is that the walk forward efficiency is



greater or equal to 50% which shows that in the future it will run at as well as 50% the rate of the walk forward. Then it sees if it in the entire walk forwards that it is profitable in at least 50% of them. This is to ensure that with a wide range of parameters the system is still profitable. The next two criteria are to see is to ensure that one single time frame of the run contributed to more than 50% of the profit or 40% of the drawdown. Overall all these criteria are used to ensure that the system will not only be profitable but be profitable consistently over time.

#### 4.1.8 Optimization

When the system was created standard input values where used initially to see if the system was viable. These standard values are shown below:

- Barsback = 20 bars
- Overbought Level = 0.84
- Oversold Level = 0.131
- Targetprofit = \$500
- Maximumloss = \$100
- NumberofShares = 100000

It was then tested on an asset of choice in this case GBPCAD to see if the system is viable. An overall profit factor over 1.25 and more than 50% of the trades being profitable were the qualities used to determine that a system was viable. The following figure is a backtest result of using standard input values for the system on GBPCAD from 1/1/2013 to 1/1/2014. The results of the backtest showed an overall profit of 3.66 which passed as a viable system and 51.67% of the trades were profitable.

TradeStation Performance Summary				Collapse ▲
	All Trades	Long Trades	Short Trades	
Total Net Profit	\$6,215.40	\$1,773.03	\$4,442.37	
Gross Profit	\$8,552.19	\$2,256.68	\$6,295.51	
Gross Loss	(\$2,336.79)	(\$483.66)	(\$1,853.14)	
Profit Factor	3.66	4.67	3.40	
Total Number of Trades	60	11	49	
Percent Profitable	51.67%	54.55%	51.02%	
Winning Trades	31	6	25	
Losing Trades	29	5	24	
Even Trades	0	0	0	

Figure 4.13: Un-Optimized Results

With showing that the system is viable un-optimized, optimization of the system began. The first thing done was seeing possible areas of improvement by looking deeper at the results of the un-optimized system. From this a few areas were found. The first area found was limiting the number of losses since these were areas where support and resistance did not work. The second area was optimizing the target profit, the maximum loss per trade and how many bars back to calculate overbought and oversold level. The overbought and oversold levels were not target to be changed in order to avoid curve fitting the system to data being tested on.

To optimize the target profit, maximum loss, and bars back Tradestation back testing capability came in handy. By giving a range of values for those inputs of the system allowed Tradestation to run all permutations of the system with those inputs and show which values of those three inputs made the system the best. A range of 8 to 25 was chosen for bars back, \$100 – 250 for maximum loss, and \$500 – \$1500 was the range for the target profit. The figure below was the result of this optimization with the barsback input being 14, the maximum loss being \$180, and the target profit being \$1500 the results showed big improvements compared to the un-optimized system on the issue of net profit and profit factor, but the percent profitable was essentially unchanged.

TradeStation Performance Summary <span>Collapse</span>			
	All Trades	Long Trades	Short Trades
Total Net Profit	\$12,575.03	\$4,347.10	\$8,227.92
Gross Profit	\$16,088.02	\$4,756.54	\$11,331.48
Gross Loss	(\$3,512.99)	(\$409.44)	(\$3,103.55)
Profit Factor	4.58	11.62	3.65
Total Number of Trades	58	9	49
Percent Profitable	51.72%	66.67%	48.98%
<a href="#">Winning Trades</a>	30	6	24
Losing Trades	28	3	25
Even Trades	0	0	0

Figure 4.14: Optimized Results

TradeStation Performance Summary <span>Collapse</span>			
	All Trades	Long Trades	Short Trades
Total Net Profit	\$7,820.63	\$4,347.10	\$3,473.52
Gross Profit	\$9,682.25	\$4,756.54	\$4,925.71
Gross Loss	(\$1,861.63)	(\$409.44)	(\$1,452.18)
Profit Factor	5.20	11.62	3.39
Total Number of Trades	35	9	26
Percent Profitable	57.14%	66.67%	53.85%
Winning Trades	20	6	14
Losing Trades	15	3	12
Even Trades	0	0	0

Figure 4.15: Results With Loss Limiting

Next was limiting the number of losses. This was done by making the system only be able to enter a certain number of consecutive same position entries. From the results it showed that the short trades were majority of the losers in the system while the longs did better. So the number of consecutive short trades was limited to 7 while the numbers of consecutive long trades were limited to 9 and the figure below showed the results of this optimization. Compared to not limiting the number of consecutive trades this final change overall made less profit, but it had a higher profit factor due to losing less money overall. Also it had a great improvement on the percent of trade being profitable.

#### 4.1.9 Future Work

There are many changes that could possibly be made to this system to improve it if time was not an issue during the project. One of the big ones that were thought of towards the end of the project was an additional entry

condition. This entry condition would check to see if in the position, long or short, had just reached the target profit last trade if it did it would wait until an entry of the opposite position before trading again. This only came to mind after thinking about how to make the strategy stay away from unwanted losses one last time. By doing this it should theoretically help make the system better.

## 4.2 Stochastic and Weighted Average Trending System

### 4.2.1 Rules

The system was developed using weighted moving averages in conjunction with stochastic oscillators to trade in the Forex market. This system works best on daily charts with trending currency pairs such as the following examples:

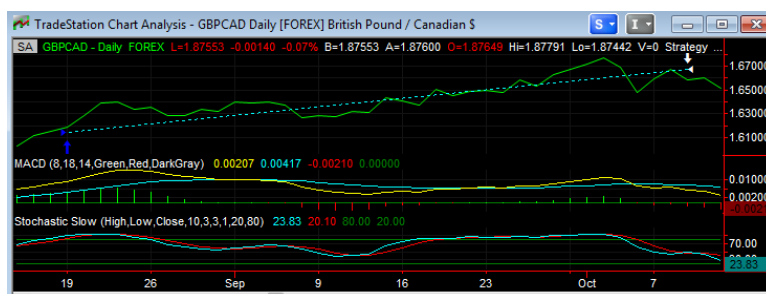


Figure 4.16: Stochastic Oscillator Currency Example GBPCAD

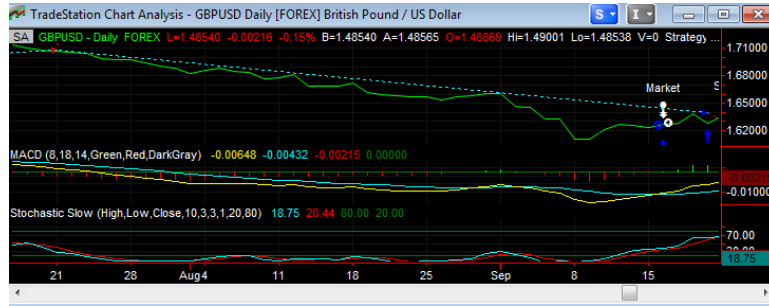


Figure 4.17: Stochastic Oscillator Currency Example GBPUSD

The system first compares the moving average of the opening prices of the current bar and previous four bars (EasyLanguage code: `Waverage(Open, 5)`) with the moving average of the opening prices of five bars ago and the opening prices of an additional four bars (EL code: `Waverage(Open[5], 5)`). If `Waverage(Open, 5)` is greater than `Waverage(Open[5], 5)` then the first buy signal is generated. If `Waverage(Open, 5)` is less than `Waverage(Open[5], 5)` then the first short signal is generated. Once either of the two signals is generated, the system then determines the positions of two stochastic oscillators, `oSlowK` (the fast stochastic oscillator `%K` smoothed by a 3 day SMA) and `oSlowD` (the slow stochastic oscillator `%D`), and generates a signal based on when they crossed and which signal was produced by the weighted moving average condition.

If a buy signal was generated by the weighted moving averages and the `oSlowK` oscillator crosses above the `oSlowD` oscillator, the system will purchase one standard lot in the Forex market. If a short signal was produced by the first condition and the `oSlowK` oscillator crosses below the `oSlowD`, the system will short one standard lot. The system will exit when the `oSlowK` oscillator crosses the `oSlowD` oscillator in the opposite direction. For example, if the buy conditions had been fulfilled, the system will sell a standard lot when the `oSlowK` curve crosses below the `oSlowD` curve. This system also will exit the market if the trade hits its stop loss, which changes according to the minimum of the lowest prices over ten bars.

## 4.2.2 Inputs

- **HighPrice:** Highest bar value to use for the high in the stochastic calculation

- LowPrice: Lowest bar value to use for the low in the stochastic calculation
- SmoothFKFD: The constant that is used to smooth the fast K line
- SmoothFDSD: The constant that is used to smooth the fast D line.
- StochasticL: Sets the number of bars to consider
- ClosePrice: The bar value that is used for the close in the stochastic calculation

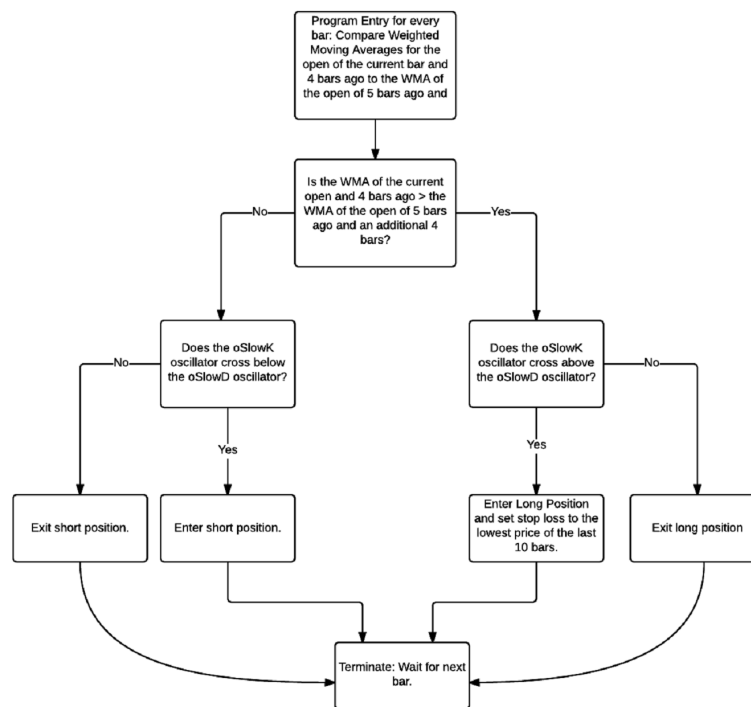


Figure 4.18: Stochastic System Flowchart

### 4.2.3 Expectancy And Expectunity

The expectancy for the Stochastic and Weighted Moving Average was approximately 1.95, which means that the system will gain 1.95 for every dollar risked per trade.

The expectunity was calculated to be around 20.63, which means that for every dollar risked per year there should be a return of 20.63.

At first glance the values for expectancy and expectunity seem to indicate that the system is decent; however the system only traded 16 times over two years. Given such a small data set, it is difficult to make any solid conclusions about the system.

### 4.2.4 System Quality

The system quality calculation yielded a value of approximately 2.83, which means that the total profit per dollar risked relative to the total variability of the profit per dollar risked is 2.82.

Again, due to a low number of trades, it is difficult to make any accurate conclusions with the system quality calculation.

### 4.2.5 Monte-Carlo Analysis

A Monte-Carlo analysis could not be performed on the system, due to the very low number of trades.

### 4.2.6 Walk Forward Analysis

005% \ Runs	5	10	15	20	25	30
10	FAILED	FAILED	FAILED	FAILED	FAILED	FAILED
15	FAILED	FAILED	FAILED	FAILED	FAILED	FAILED
20	FAILED	FAILED	FAILED	FAILED	FAILED	FAILED
25	FAILED	FAILED	FAILED	FAILED	FAILED	FAILED
30	FAILED	FAILED	FAILED	FAILED	FAILED	FAILED

Figure 4.19: System Walk Forward Cluster Result

	Test Criteria	Result	Comment
1	Overall Profitability	Failed	Total Profit <= 0. System is NOT likely to perform profitable on unseen data
2	Walk-Forward Efficiency	Failed	Walk-Forward Efficiency < 50%. System is likely to perform in future at a rate of less than 50% of those achieved during optimization
3	Consistency of Profits	Failed	Less than 50% of walk-forward runs were profitable. System is NOT likely to be successful in future.
4	Distribution of Profits	Failed	Walk-forward run #10 contributed more than 50% of Total Net Profit.
5	Maximum Drawdown	Pass	No individual run had a drawdown of more than 40% of initial capital.
	OVERALL RESULT	FAILED	

Figure 4.20: System Walk Forward Individual Result

Due to the very low number of trades, the walk forward analysis concluded that my system is unlikely to do well with unseen data.

## 4.2.7 Optimization

The parameters that I decided to optimize was SmoothFKFD, SmoothFDSD, and StochasticL, which were set to 35, 3, and 3 respectively originally.

	All Trades	Long Trades	Short Trades
Total Net Profit	\$5,605.16	\$4,499.96	\$1,105.20
Gross Profit	\$21,255.20	\$13,244.87	\$8,010.33
Gross Loss	(\$15,650.04)	(\$8,744.91)	(\$6,905.13)
Profit Factor	1.36	1.51	1.16
Roll Over Credit	(\$322.37)	(\$534.85)	\$212.48
Open Position P/L	(\$24.14)	(\$24.14)	\$0.00
Select Total Net Profit	\$5,605.16	\$4,499.96	\$1,105.20
Select Gross Profit	\$21,255.20	\$13,244.87	\$8,010.33
Select Gross Loss	(\$15,650.04)	(\$8,744.91)	(\$6,905.13)
Select Profit Factor	1.36	1.51	1.16
Adjusted Total Net Profit	(\$4,258.18)	(\$2,453.82)	(\$6,352.53)
Adjusted Gross Profit	\$15,574.51	\$9,056.48	\$4,005.16
Adjusted Gross Loss	(\$19,832.69)	(\$11,510.30)	(\$10,357.69)
Adjusted Profit Factor	0.79	0.79	0.39
Total Number of Trades	28	20	8
Percent Profitable	50.00%	50.00%	50.00%
Winning Trades	14	10	4
Losing Trades	14	10	4
Even Trades	0	0	0

Figure 4.21: Pre-optimization GBPCAD

This system was tested on GBPCAD to see how well the system performed. It passed the requirement of 1.25 for the profit factor and just met



the requirement of 50% of trades profitable. However, while the system was running a net profit, the numbers were not satisfactory. Therefore, an optimization test was ran using tradestation's optimization tool.

	<b>All Trades</b>	<b>Long Trades</b>	<b>Short Trades</b>
Total Net Profit	\$24,790.05	\$18,619.98	\$6,170.08
Gross Profit	\$29,330.11	\$23,160.03	\$6,170.08
Gross Loss	(\$4,540.06)	(\$4,540.06)	\$0.00
Profit Factor	6.46	5.10	n/a
Roll Over Credit	(\$153.64)	(\$471.60)	\$317.96
Open Position P/L	\$3,606.47	\$0.00	\$3,606.47
Select Total Net Profit	\$24,790.05	\$18,619.98	\$6,170.08
Select Gross Profit	\$29,330.11	\$23,160.03	\$6,170.08
Select Gross Loss	(\$4,540.06)	(\$4,540.06)	\$0.00
Select Profit Factor	6.46	5.10	n/a
Adjusted Total Net Profit	\$13,916.32	\$9,265.76	\$0.00
Adjusted Gross Profit	\$20,486.75	\$15,836.19	\$0.00
Adjusted Gross Loss	(\$6,570.43)	(\$6,570.43)	\$0.00
Adjusted Profit Factor	3.12	2.41	n/a
Total Number of Trades	16	15	1
Percent Profitable	68.75%	66.67%	100.00%
Winning Trades	11	10	1
Losing Trades	5	5	0
Even Trades	0	0	0

Figure 4.22: Post-optimization GBPCAD

The optimization test set the values for each of the parameters to be 10, 5, and 3 for SmoothFKFD, SmoothFDSD, and StochasticL respectively. This test improved most of the numbers including profit factor, net profit, and percentage of trades profitable. However, it decreased the total number of trades as well. Due to this, the system was ran on a few other currency pairs to see if it still ran a profit. After checking on several currency pairs, the system still ran profits for some of the pairs. A few of the results are displayed below

	All Trades	Long Trades	Short Trades
Total Net Profit	\$4,613.20	(\$4,255.20)	\$8,868.40
Gross Profit	\$22,172.60	\$4,174.60	\$17,998.00
Gross Loss	(\$17,559.40)	(\$8,429.80)	(\$9,129.60)
Profit Factor	1.26	0.50	1.97
Roll Over Credit	(\$691.80)	(\$40.20)	(\$651.60)
Open Position P/L	(\$6,165.90)	\$0.00	(\$6,165.90)
Select Total Net Profit	\$4,613.20	(\$4,255.20)	\$8,868.40
Select Gross Profit	\$22,172.60	\$4,174.60	\$17,998.00
Select Gross Loss	(\$17,559.40)	(\$8,429.80)	(\$9,129.60)
Select Profit Factor	1.26	0.50	1.97
Adjusted Total Net Profit	(\$7,759.82)	(\$8,501.15)	(\$8,422.91)
Adjusted Gross Profit	\$14,333.40	\$2,470.33	\$5,271.49
Adjusted Gross Loss	(\$22,093.22)	(\$10,971.48)	(\$13,694.40)
Adjusted Profit Factor	0.65	0.23	0.38
Total Number of Trades	23	17	6
Percent Profitable	34.78%	35.29%	33.33%
Winning Trades	8	6	2
Losing Trades	15	11	4
Even Trades	0	0	0

Figure 4.23: System results for GBPUSD

	All Trades	Long Trades	Short Trades
Total Net Profit	\$15,552.10	(\$2,963.50)	\$18,515.60
Gross Profit	\$25,005.30	\$2,815.30	\$22,190.00
Gross Loss	(\$9,453.20)	(\$5,778.80)	(\$3,674.40)
Profit Factor	2.65	0.49	6.04
Roll Over Credit	(\$4.90)	(\$58.50)	\$53.60
Open Position P/L	\$874.60	\$0.00	\$874.60
Select Total Net Profit	\$15,552.10	(\$2,963.50)	\$18,515.60
Select Gross Profit	\$25,005.30	\$2,815.30	\$22,190.00
Select Gross Loss	(\$9,453.20)	(\$5,778.80)	(\$3,674.40)
Select Profit Factor	2.65	0.49	6.04
Adjusted Total Net Profit	\$1,218.32	(\$6,730.34)	(\$5,795.82)
Adjusted Gross Profit	\$13,822.59	\$1,407.65	\$0.00
Adjusted Gross Loss	(\$12,604.27)	(\$8,137.99)	(\$5,795.82)
Adjusted Profit Factor	1.10	0.17	0.00
Total Number of Trades	14	10	4
Percent Profitable	35.71%	40.00%	25.00%
Winning Trades	5	4	1
Losing Trades	9	6	3
Even Trades	0	0	0

Figure 4.24: System results for EURUSD

	<b>All Trades</b>	<b>Long Trades</b>	<b>Short Trades</b>
Total Net Profit	(\$6,484.60)	\$8,201.71	(\$14,686.30)
Gross Profit	\$14,856.17	\$14,856.17	\$0.00
Gross Loss	(\$21,340.77)	(\$6,654.46)	(\$14,686.30)
Profit Factor	0.70	2.23	0.00
Roll Over Credit	(\$656.70)	\$9.08	(\$665.77)
Open Position P/L	\$0.00	\$0.00	\$0.00
Select Total Net Profit	(\$6,484.60)	\$8,201.71	(\$14,686.30)
Select Gross Profit	\$14,856.17	\$14,856.17	\$0.00
Select Gross Loss	(\$21,340.77)	(\$6,654.46)	(\$14,686.30)
Select Profit Factor	0.70	2.23	0.00
Adjusted Total Net Profit	(\$18,534.18)	\$71.45	(\$22,029.45)
Adjusted Gross Profit	\$9,241.07	\$9,241.07	\$0.00
Adjusted Gross Loss	(\$27,775.25)	(\$9,169.61)	(\$22,029.45)
Adjusted Profit Factor	0.33	1.01	0.00
Total Number of Trades	18	14	4
Percent Profitable	38.89%	50.00%	0.00%
Winning Trades	7	7	0
Losing Trades	11	7	4
Even Trades	0	0	0

Figure 4.25: System results for GBPJPY

	<b>All Trades</b>	<b>Long Trades</b>	<b>Short Trades</b>
Total Net Profit	\$18,033.62	\$541.79	\$17,491.83
Gross Profit	\$21,984.23	\$2,907.08	\$19,077.14
Gross Loss	(\$3,950.61)	(\$2,365.30)	(\$1,585.32)
Profit Factor	5.56	1.23	12.03
Roll Over Credit	(\$1,565.50)	\$102.23	(\$1,667.73)
Open Position P/L	\$0.00	\$0.00	\$0.00
Select Total Net Profit	\$18,033.62	\$541.79	\$17,491.83
Select Gross Profit	\$21,984.23	\$2,907.08	\$19,077.14
Select Gross Loss	(\$3,950.61)	(\$2,365.30)	(\$1,585.32)
Select Profit Factor	5.56	1.23	12.03
Adjusted Total Net Profit	\$7,661.84	(\$1,877.38)	\$2,881.26
Adjusted Gross Profit	\$13,009.21	\$1,453.54	\$5,587.57
Adjusted Gross Loss	(\$5,347.36)	(\$3,330.92)	(\$2,706.30)
Adjusted Profit Factor	2.43	0.44	2.06
Total Number of Trades	14	10	4
Percent Profitable	42.86%	40.00%	50.00%
Winning Trades	6	4	2
Losing Trades	8	6	2
Even Trades	0	0	0

Figure 4.26: System results for CADCHF

These results seem to indicate that the while the system retains profitability, its win percentage drops across the board. This result might not be a good sign because the system could have got lucky and had a few big wins that offset the losses.

### 4.2.8 Future Work

There are a few modifications that could be done to improve the system if time was not an issue. The first change to the system would be to find a better way to detect trends in the market. Currently, the weighted moving average performs adequately, however it limited the number of trades too much and gave too many false buy and sell signals. A relative strength indicator might improve the system since the indicator attempts to find out if the asset in question is overbought or oversold; however testing would be necessary to determine the effectiveness of that indicator in conjunction with the stochastic oscillators. An additional change to the system would be to the stop-loss condition. For a few of the currency pairs, the stop-loss was not keeping the losses to an acceptable level. A more static stop-loss could be more effective, since an investor could set the condition to something within their tolerance levels.

## 4.3 Voting Trend Following System

One of the systems the group developed was a "voting" trend following system. This system incorporated a number of simpler systems in order to determine a overall opinion, which it then proceeded to trade. The system also used the ADX indicator to attempt to avoid trading during directionless periods.

### 4.3.1 Development

This strategy was originally simply a Double Moving average strategy, which was combined with the ADX in order to increase reliability. However, while the idea worked decently, it did not work well on a variety of assets, and tended to only work on a sub-section of the stocks it was back-tested on. In an attempt to increase the percentage of working assets, further hybridization was attempted with a simple "voting" system, one of the simplest methods of combining two predictive algorithms.

While the first hybridization was moderately successful, despite the sacrifices made to create the meta system, further work was done in order to increase reliability. In this case, a support and resistance strategy was added in order to create a viable exit.

The system was then optimized on the weighting of the systems, and the optimization showed that the system performed best when it was at it's least careful, with "pure" majority wins voting for the two trend following systems and the support and resistance strategy acting as a exit.

### 4.3.2 Sub-strategies

The following strategies were used in order to formulate entry and exit rules.

- A simple double moving average strategy, with it's own hybridization with the ADX
- A simple MACD Strategy
- A simple Bollinger band strategy (Acts as a exit)

Each of these strategies generates a "opinion" every bar, and the strategy is updates according to the opinion. After testing, it has been found that having the double moving average (DMA) and MACD strategies equivalently weighted, with the Bollinger band strategy (which only generates opinions extremely rarely) with a high negative weight to serve as a exit works best. Each sub-strategy has it's own parameters, which are fit separately in order to avoid over-fitting the data (and to avoid a truly excessive amount of computation time)

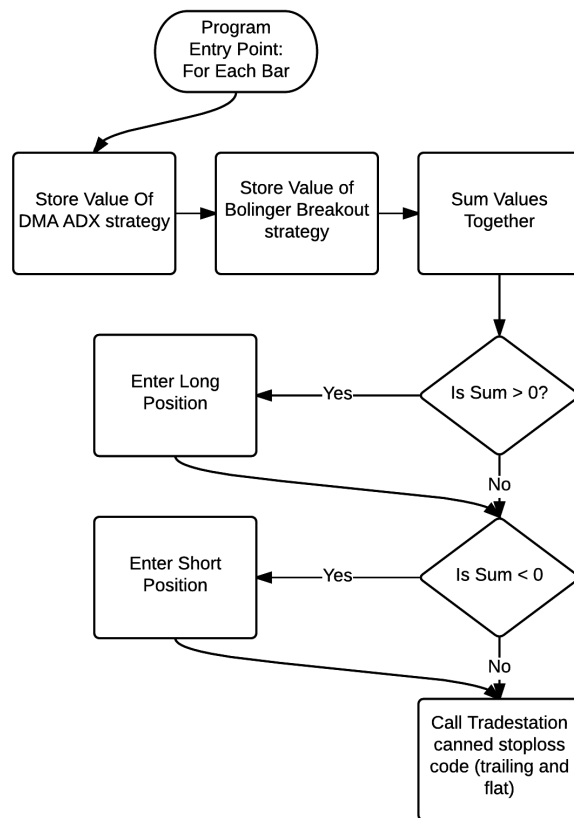


Figure 4.27: Flow chart representation of hybrid strategy

### 4.3.3 Double Moving Average Sub-Strategy

The principle behind it was to take arguably the simplest trend following strategy, buy when a short average crosses over a longer average, and attempt to make it profitable by removing sideways market time by ensuring that it only generated a position when the market was trending. As with the end strategy, the ADX was the means used to attempt to do this.

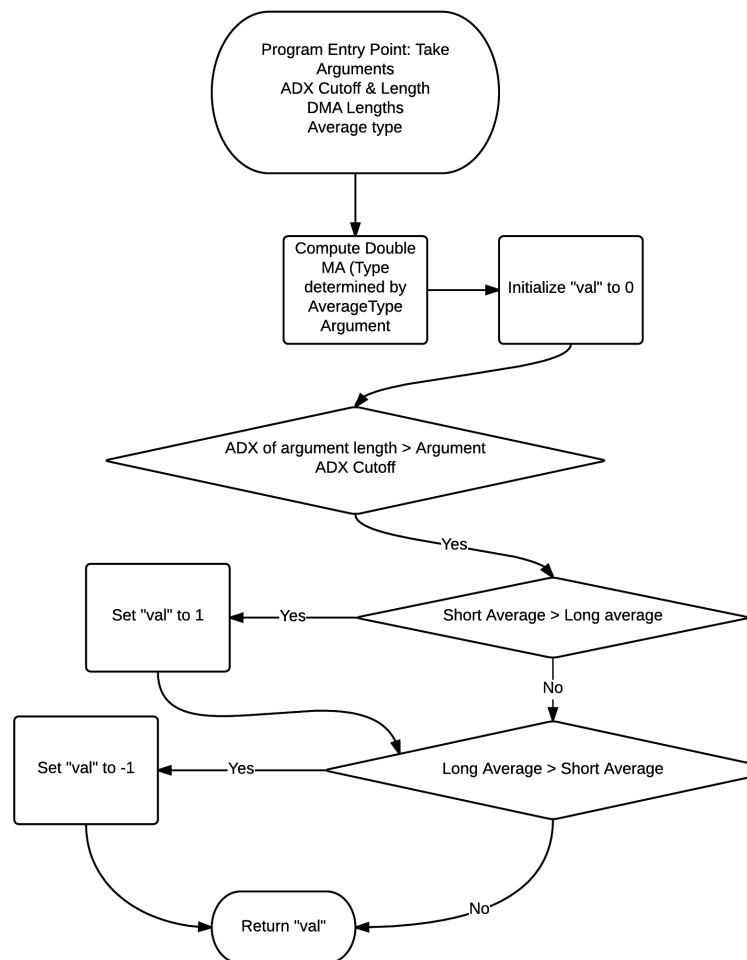


Figure 4.28: Flow chart representation of double moving average hybridized with the ADX strategy

#### 4.3.4 MACD Sub-Strategy

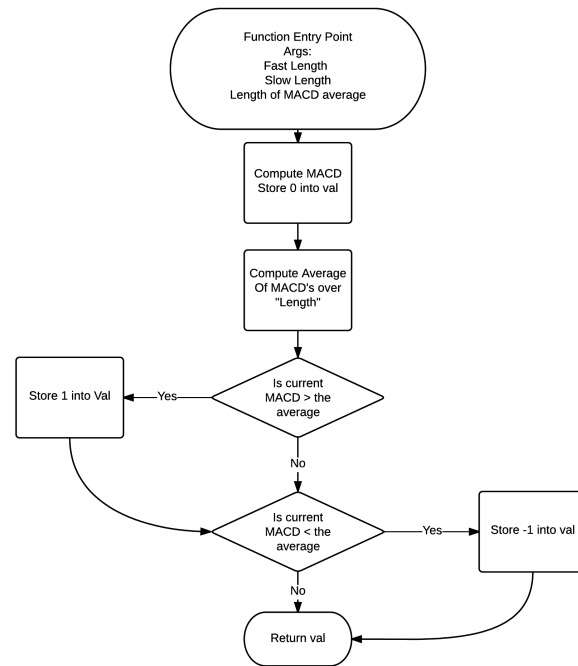


Figure 4.29: Flow chart representation of MACD strategy



### 4.3.5 Bollinger Band Sub-Strategy

The Bollinger band substrategy serves as a profit taking exit condition. In general execution, it has a higher weight than both of the other strategies, but generally only generates decisions rarely. A Bollinger band strategy uses a middle average and two "lines" that are a discrete number of standard deviations away from them. Since the asset will be within the lines under practically all normal conditions, it leaving the lines indicates that the stock is overbought/oversold, and as such the trend is likely to reverse.

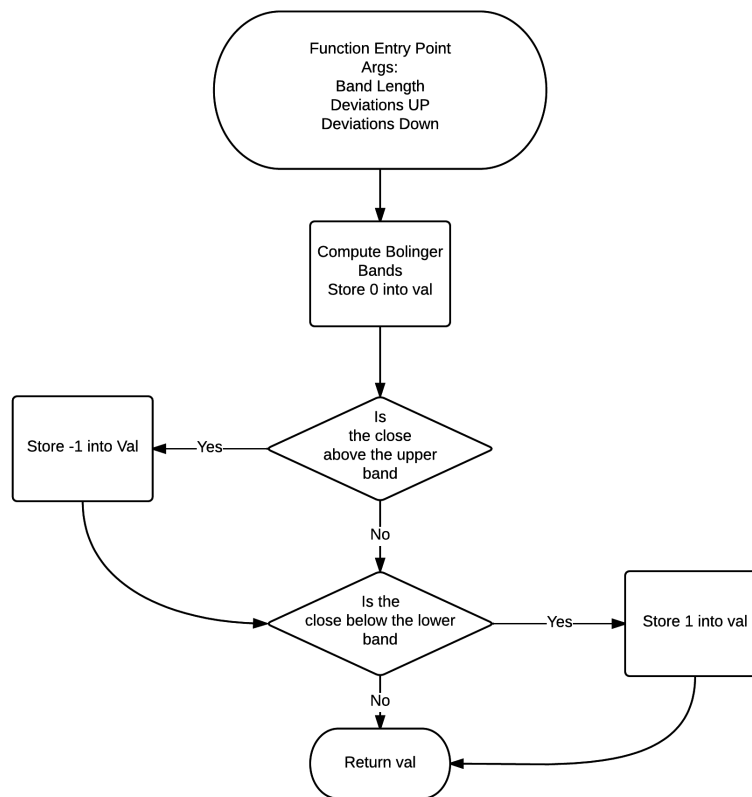


Figure 4.30: Flow chart representation of Bollinger band strategy

### 4.3.6 Other Strategy Sections

Other strategy sections include a standard stop loss in order to mitigate risk, and a trailing stop in order to increase profitability. After testing, it was discovered that the optimal execution for the strategy was on daily charts, where the strategy would generate a daily position based on the other positions, leave it if the position became untenable, and otherwise exit when the trailing stop would occur.



Figure 4.31: Sample Execution on the ending 3 months of 2014 on GBPCAD

The strategy makes a lot of daily trades, and generally speaking eats quite a lot of commission costs (which is why you want to run it on daily charts). However, the strategy makes up for those overhead costs by being incredibly reliable, with a almost 90% win rate and a very high profit factor. The strategy also requires a asset which tends toward sustained daily moves, and also moves enough each day to make up for it's overhead costs.

### 4.3.7 Expectancy

The expectancy of the system was 0.272, rather small. However the expectancy, 14.17, is comparatively larger, which is largely due to the system's high number of trades for each year, it doesn't expect to make that much per trade, but it can make quite a large number of trades rather quickly. The system also has a roughly equivalent average and maximum risk, which by and large is due to the stop loss design. The system quality, 3.08, is rather large due to the very low variability in my strategy, which works out to be 0.55.

	Based On Average Risk	Based On Maximum Risk
Expectancy	0.271858	0.271713
Expectunity	14.175465	14.16789

Opportunity	40
Std. Deviation Of Risk	0.557758
System Quality	3.082665

### 4.3.8 Monte-Carlo Analysis

Monte Carlo analysis of the system is used to determine whether or not the system is mathematically profitable, or if the system was merely "lucky" as well as to determine the best position sizing rules for the strategy.

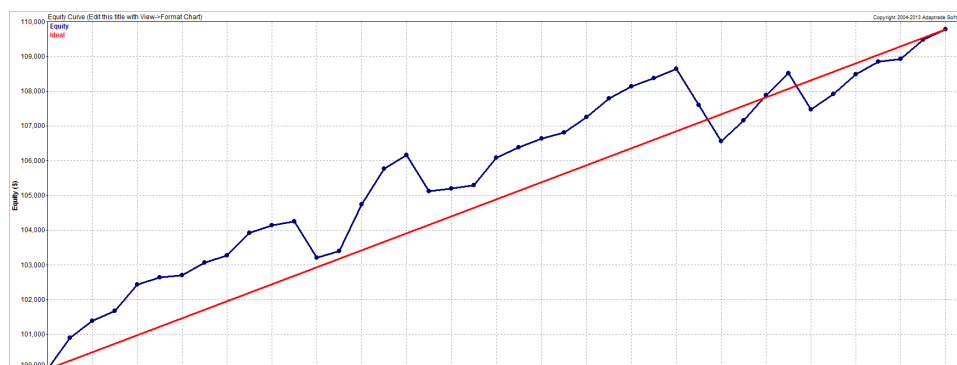


Figure 4.32: Sample Equity Curve (with randomized trade order)

The strategy makes a lot of small profits and the occasional larger loss, this is reflected in the strategy's report, showing a general uptrend, with occasional sharp drops. Generally speaking, the maximum draw-down will 97% of the time be below a third of the yearly profit, indicating a truly horrible run of luck.

#### Trading Parameters

Initial Account Equity: \$100,000.00  
 Trading Vehicle: Stocks  
 Minimum Margin Requirement: 100.0%  
 Slippage per side: \$0.00 per trade  
 Commissions and fees per side: \$15.00 per trade

Position Sizing Method: None  
 No. Shares: From input data  
 Number of Monte Carlo Samples: 10,000

#### Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	9.786	1.838	5.325	0.4373
60	9.786	1.919	5.099	0.4357
70	9.786	1.995	4.904	0.4340
80	9.786	2.080	4.705	0.4321
85	9.786	2.282	4.289	0.4309
90	9.786	2.545	3.845	0.4295
91	9.786	2.601	3.762	0.4292
92	9.786	2.673	3.661	0.4288
93	9.786	2.739	3.573	0.4283
94	9.786	2.790	3.508	0.4278
95	9.786	2.851	3.432	0.4274
96	9.786	2.924	3.346	0.4268
97	9.786	2.998	3.264	0.4261
98	9.786	3.082	3.175	0.4252
99	9.786	3.386	2.890	0.4237
100	9.786	4.616	2.120	0.4165

#### Monte Carlo Results at 95.00% Confidence

Total Net Profit: \$9,785.90	Max Number of Shares: 100,000
Final Account Equity: \$109,785.90	Minimum Number of Shares: 100,000
Return on Starting Equity: 9.786%	Average Number of Shares: 100,000
Profit Factor: 2.881	
Largest Winning Trade: \$1,338.10	Largest Losing Trade: (\$1,040.80)
Largest Winning Trade (%): 1.234%	Largest Losing Trade (%): -1.046%
Average Winning Trade: \$428.21	Average Losing Trade: (\$1,040.26)
Average Winning Trade (%): 0.4050%	Average Losing Trade (%): -1.022%
Average Trade: \$244.65	Win/Loss Ratio: 0.4116
Average Trade (%): 0.2350%	Win/Loss Ratio (%): 0.4059
Trade Standard Deviation: \$563.48	Max Consecutive Wins: 10
Trade Standard Deviation (%): 0.5502%	Max Consecutive Losses: 2
Worst Case Drawdown: (\$3,120.00)	Return/Drawdown Ratio: 3.432
Worst Case Drawdown (%): 2.851%	Modified Sharpe Ratio: 0.4274
Average Drawdown: (\$2,080.65)	
Average Drawdown (%): 1.987%	

Figure 4.33: Monte-Carlo Confidence Levels

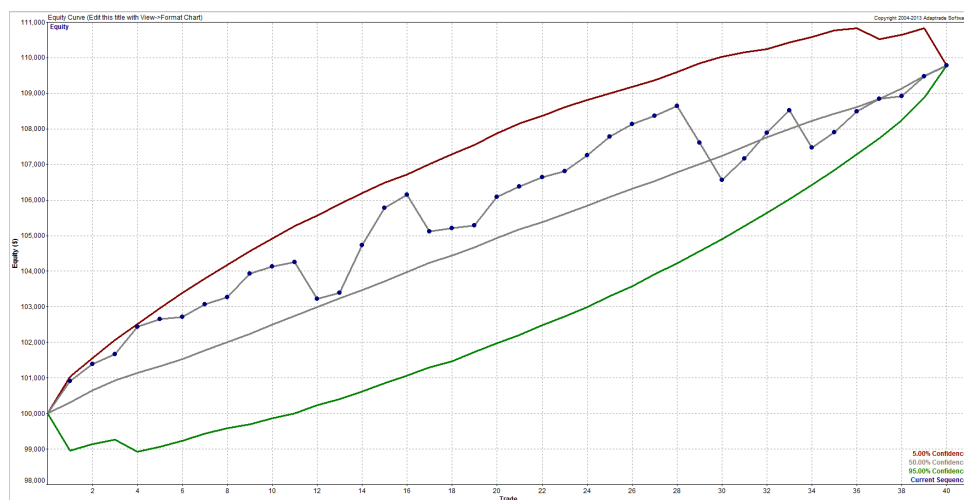


Figure 4.34: Monte-Carlo 95% Confidence Interval Graph

The graph shows the relatively large amount of randomness in the system, although it underscores the volatility of the system. It is suspected that some of these issues are due to the system being completely automated and unable to avoid risk filled days during execution.

## 4.3.9 Sample Long Term Execution

### 4.3.9.1 GBPCAD 2010 thru 2013

	<b>All Trades</b>	<b>Long Trades</b>	<b>Short Trades</b>
Total Net Profit	\$117,862.60	\$65,066.10	\$52,796.50
Gross Profit	\$188,039.60	\$97,419.50	\$90,620.10
Gross Loss	(\$70,177.00)	(\$32,353.40)	(\$37,823.60)
Profit Factor	2.68	3.01	2.40
Roll Over Credit	(\$479.40)	\$66.10	(\$545.50)
Open Position P/L	\$1,149.00	\$0.00	\$1,149.00
Select Total Net Profit	\$106,003.60	\$57,501.20	\$48,502.40
Select Gross Profit	\$176,180.60	\$89,854.60	\$86,326.00
Select Gross Loss	(\$70,177.00)	(\$32,353.40)	(\$37,823.60)
Select Profit Factor	2.51	2.78	2.28
Adjusted Total Net Profit	\$96,571.25	\$50,270.44	\$37,500.21
Adjusted Gross Profit	\$177,576.80	\$89,858.28	\$83,387.83
Adjusted Gross Loss	(\$81,005.55)	(\$39,587.84)	(\$45,887.62)
Adjusted Profit Factor	2.19	2.27	1.82
Total Number of Trades	365	186	179
Percent Profitable	88.49%	89.25%	87.71%
Winning Trades	323	166	157
Losing Trades	42	20	22
Even Trades	0	0	0
Avg. Trade Net Profit	\$322.91	\$349.82	\$294.95
Avg. Winning Trade	\$582.17	\$586.86	\$577.20
Avg. Losing Trade	(\$1,670.88)	(\$1,617.67)	(\$1,719.25)
Ratio Avg. Win:Avg. Loss	0.35	0.36	0.34
Largest Winning Trade	\$3,135.60	\$3,135.60	\$2,270.00
Largest Losing Trade	(\$2,020.90)	(\$2,020.80)	(\$2,020.90)
Largest Winner as % of Gross Profit	1.67%	3.22%	2.50%
Largest Loser as % of Gross Loss	2.88%	6.25%	5.34%

Figure 4.35: Sample Execution Results

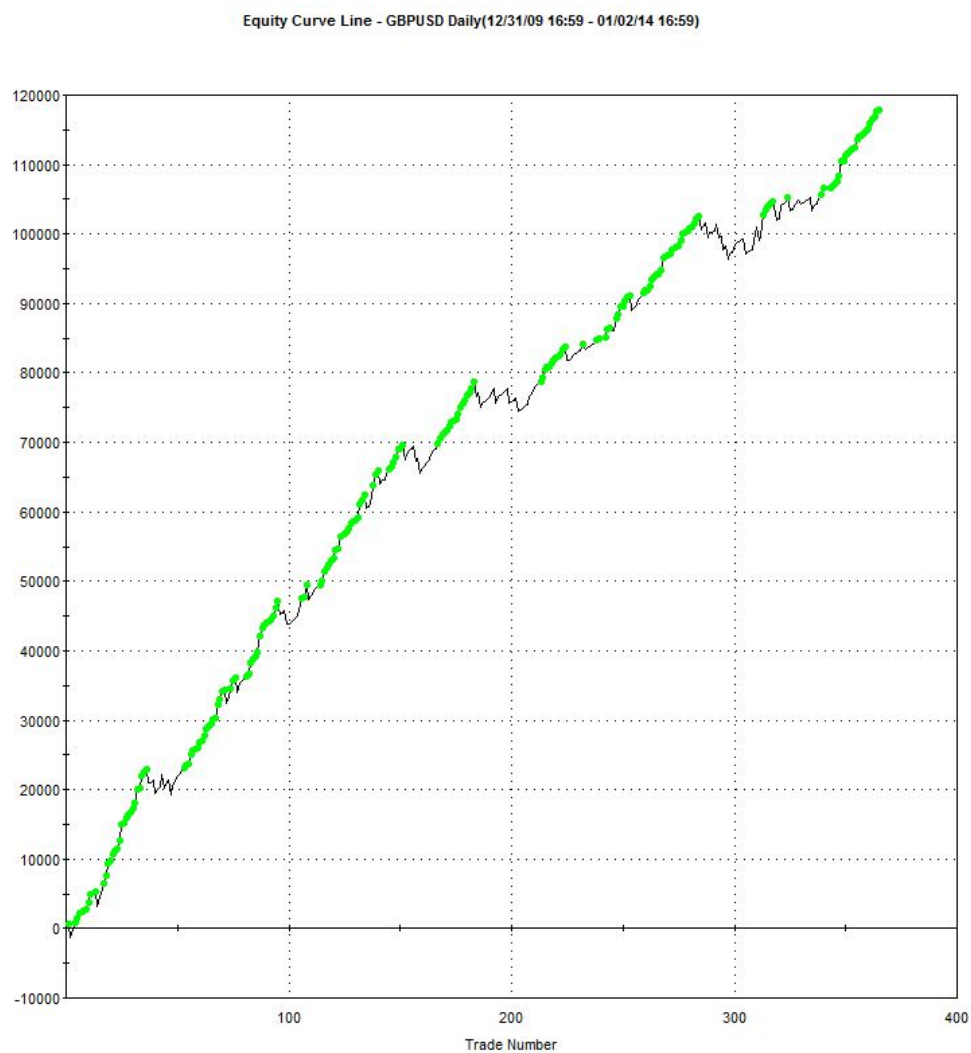


Figure 4.36: Sample Equity Curve Results

## 4.4 System Of Systems

In order to improve the performance all three of the separate systems were combined into one single system of system. The new system that was made would trade the Overbought and Oversold system when the asset is not trending. While the asset is trending it would trade using the Voting Trending system that has the Stochastic and Weighted Moving Average system as another opinion in the voting which made this portion of the system more reliable.

### 4.4.1 Rules

#### 4.4.1.1 Determining Which Sub-System Currently Trades

Since this system of systems has both a trending and a non-trending strategy built into it was obvious to make the non-trending part of the system run when the asset is currently is not trending, and when it is trending allow the trending portion of the system run. This was partially achieved by itself in the Voting Trending System when it would only run when the ADX value was greater than 20, since this shows that the asset is currently trending. Thus it was made such that the non-trending portion of the system would run when the ADX value of the asset was less than 20.

#### 4.4.1.2 Entry Rules

To enter a trade the system would first see which entry conditions should it be looking at by checking the ADX value to see if the non-trending or the trending system is currently in use. If it was in non-trending mode then the entry rules would be the same as the entry rules for the Overbought and Oversold System. If it was trending its entry rules would be the same as the entry rules of the Voting Trending System.

#### 4.4.1.3 Exit Rules

Once again the exit rules would act the same as the entry rules in this system by being unique to each portion of the system. With the non-trending system making use of a target profit level and a trailing stop just like the ones in the Overbought and Oversold System, and the trending strategy making use of a two stop losses. One which is a fixed stop loss that equates to the



maximum loss a trade can make while in the trending portion of the system of systems, and another which is a trailing stop loss that locks in a percentage of the profit that activates when a certain profit has been reached.

#### **4.4.2 Expectancy And Expectunity**

The expectancy of the system of systems was calculated to be 0.778. The expectancy being a positive number is a good thing due to the fact that it means that for every dollar risked it should gain 0.778 dollars back per trade. This by itself is not a factor of a successful system so expectunity is also calculated. Expectunity is the profit or loss per dollar risked per year. The expectunity for the system of systems was calculated to be 138.16. This means that for every dollar risked per year there should be a return of 138.16 dollars. Overall both the expectancy and expectunity values showed indications that the system of systems is a good system. A good thing to note is that the expectancy per trade for the system of systems is lower than the expectancy for the Overbought and Oversold system thus it might be beneficial if one person is going to trade these system for only one month the Overbought and Oversold system might yield better results profit wise, but if traded for more than a year than the system of systems would be better since it has a higher expectunity.

#### **4.4.3 System Quality**

The system quality calculation is another technique to assess how well a system is. System quality itself is a dimensionless value that shows the product of the average winning trade and the square root of the number of trades divided by the standard deviation of the winning trades. The bigger the number for system quality shows how good the system is. For the system of systems the system quality was found to be 5.33. This compared to the other systems is a higher number which represents that the system of systems is of a higher quality than the base systems independently.

#### **4.4.4 Monte-Carlo**

The figure below shows the 95% confidence interval of the system of systems. As shown in the figure the blue dotted line represents the trades of the system of systems in the order that they occurred. While the red green and

gray lines are the 95% confidence interval. By having the actual trade list in order be inside the confidence interval ensures that the system is acting as expected.

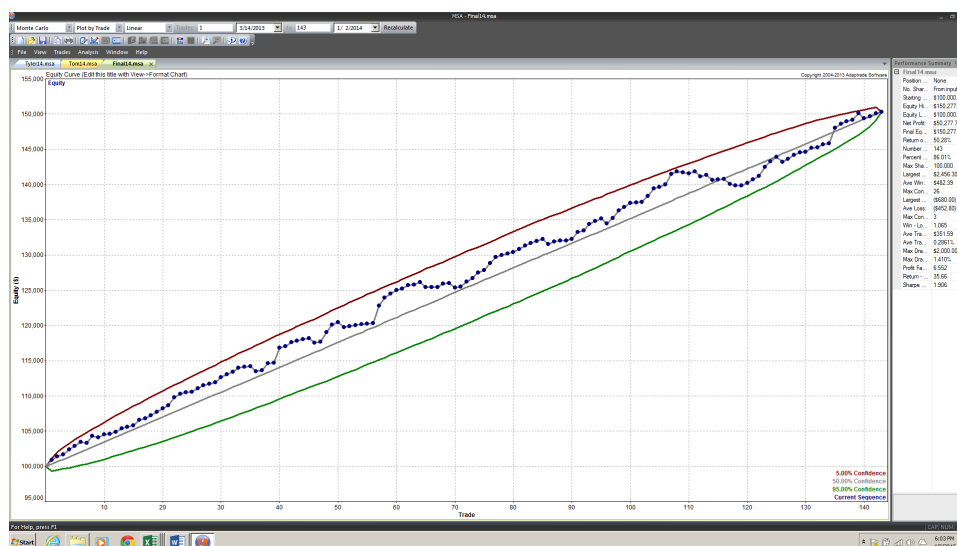


Figure 4.37: Monte-Carlo 95% Confidence Level Graph

The figure above shows the results of the 95% confidence interval. It shows that with 95% confidence the system of systems will have a return rate of 47.08% with a max drawdown of 1.036%. Comparing this to the individual systems it has beaten them both by at least 40% on rate of return and by at least 0.125% for maximum drawdown. This further shows the system of systems performs better than the individual systems.

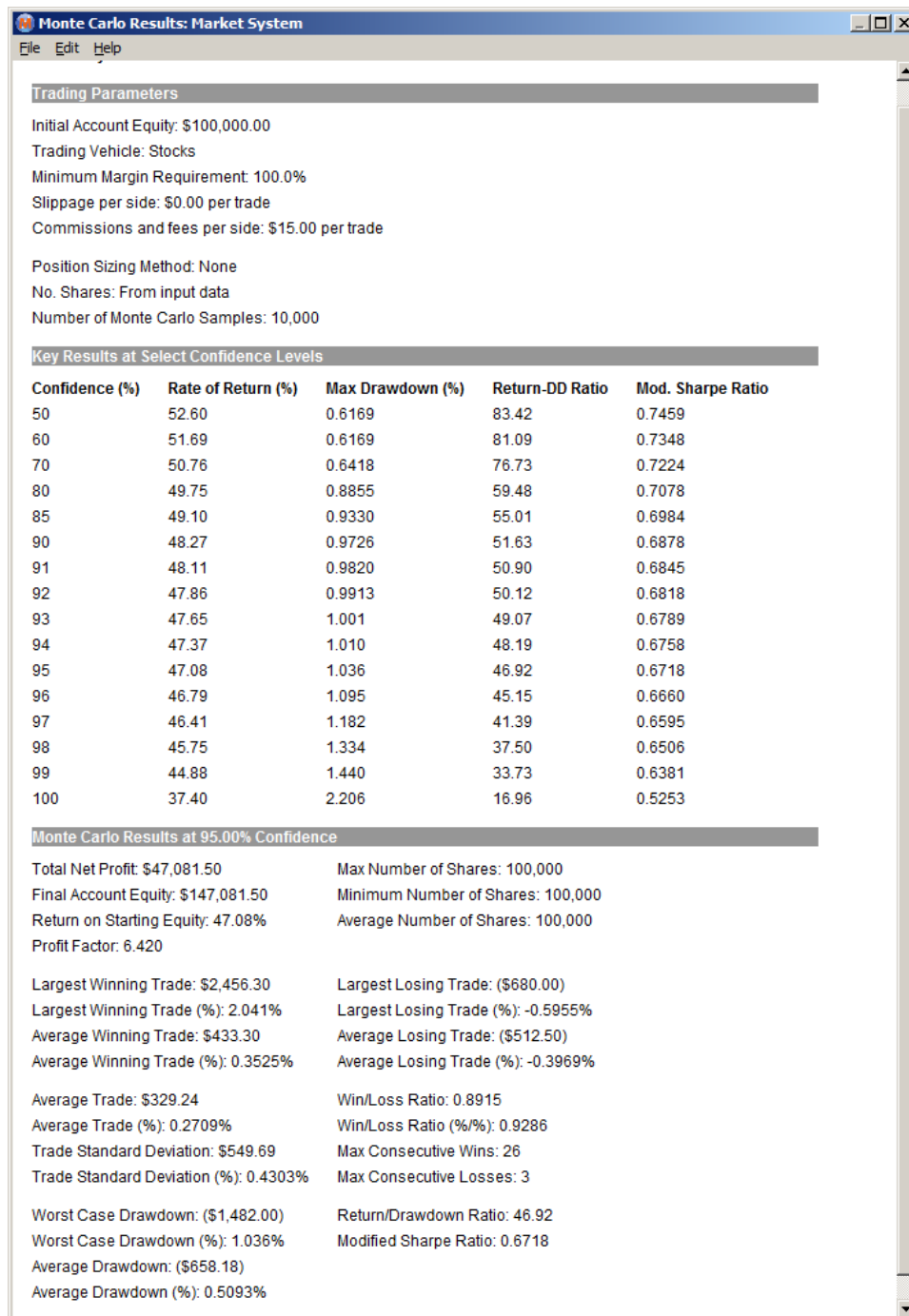


Figure 4.38: Monte-Carlo Confidence Levels

It is also possible to make a 95% confidence interval for future trades. It does this by running the montecarlo simulations on a fraction of the trades you have down then projecting those results on the future results to see how it occurs. A sign that the system is good is one where the line stays inside the 95% interval which shows that it is operating normal even with unknown data, while if it is outside of the 95% there is an indication of something bad in the system. This type of interval can be seen below which showed that it stayed within the confidence interval. This is a good result since future trades should act like this too.

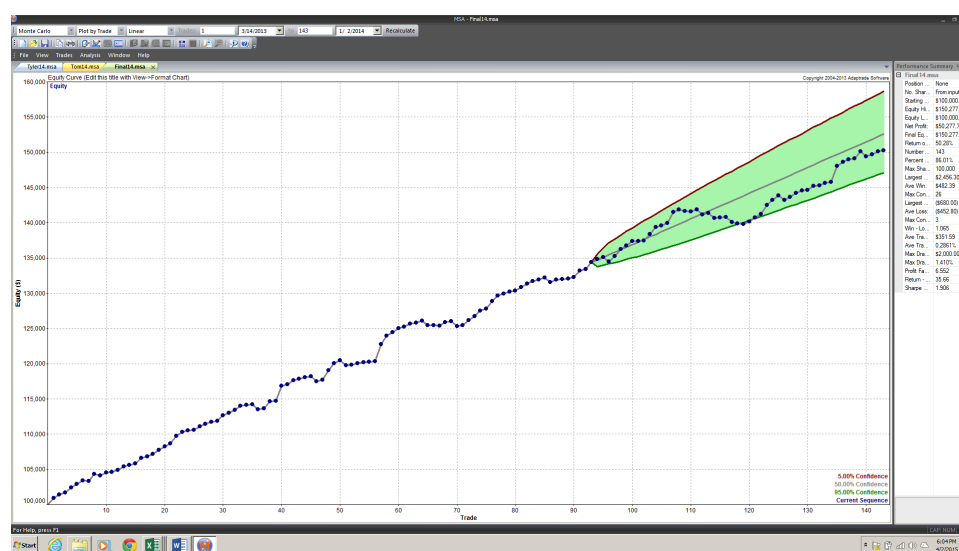


Figure 4.39: Monte-Carlo Predictive Analysis Graph

Lastly using Monte Carlo simulations can be used to get optimal position sizing. It does so by using an investing technique where as you win money you risk more and as you lose you risk less. Then it uses the list of trades and optimizes the position sizing for the parameter selected. Using this technique the system was optimized for position using net profit and return to drawdown ratio. The results for the optimized position sizing via the net profit are shown in the figure below. It shows that the optimal position size when trying for the best return to drawdown ration is 200% of the initial equity per trade. By doing so it expects \$541387 of profit with this position sizing. When it was optimized for the best return to drawdown ratio as shown in figure !! it showed the same result of 200% of the initial equity per

trade. This shows a good sign in the fact that that using this position size in trading should be the best for net profit and the best for keeping my return rate higher than my maximum drawdown per trade.

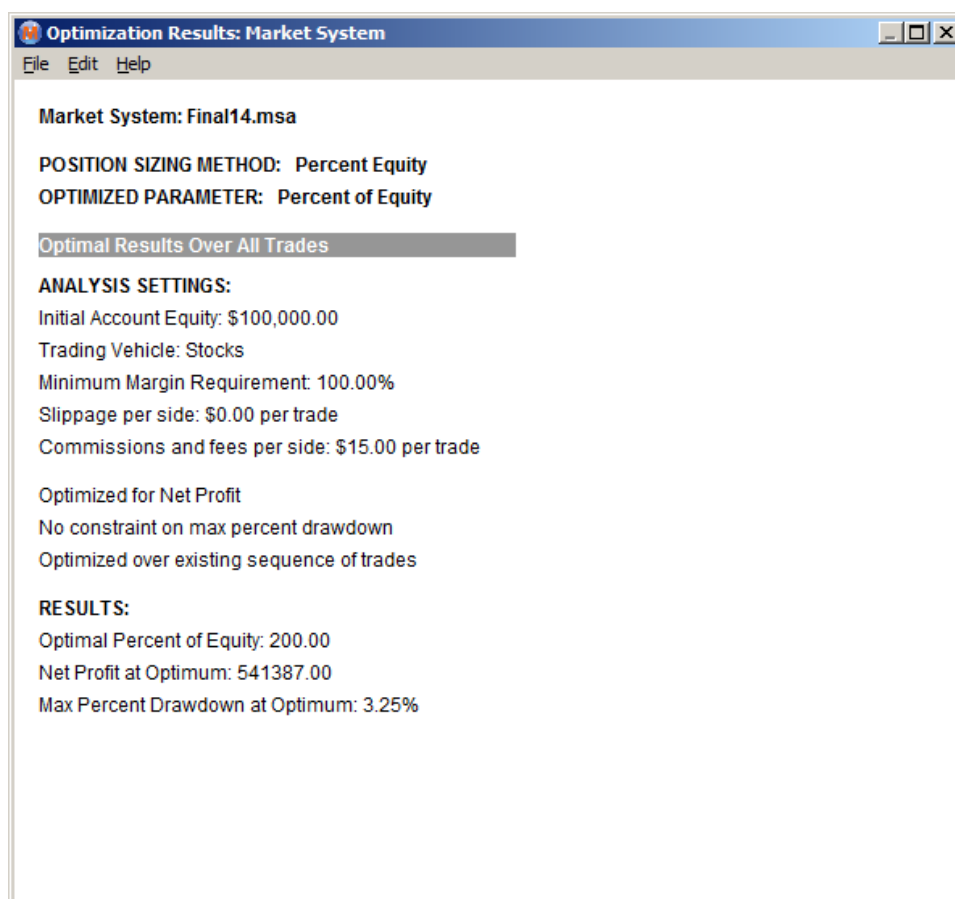


Figure 4.40: Monte-Carlo Position Sizing Via Net Profit

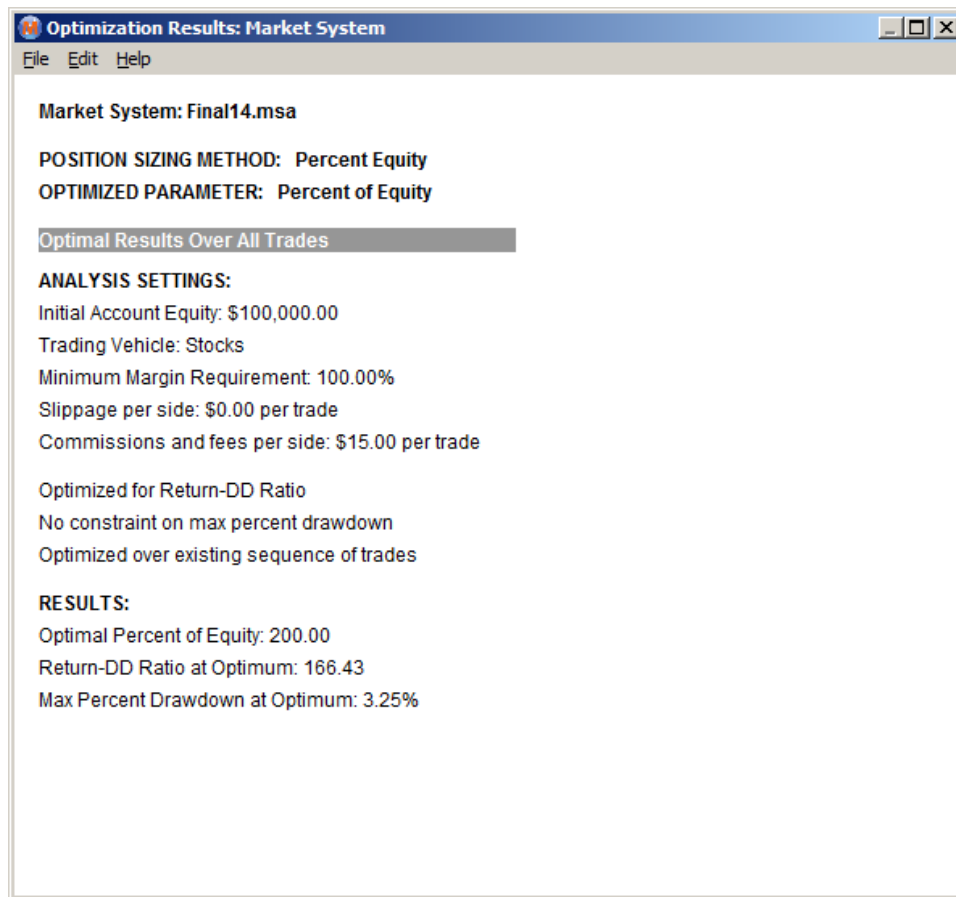


Figure 4.41: Monte-Carlo Position Sizing Via Return / Draw-down Ratio

Above is the result of fixing the position sizing. As can be seen the equity line of the trades with position size fixing is above the ideal line in red. While it does fluctuate down sometimes overall it is a constant profit.

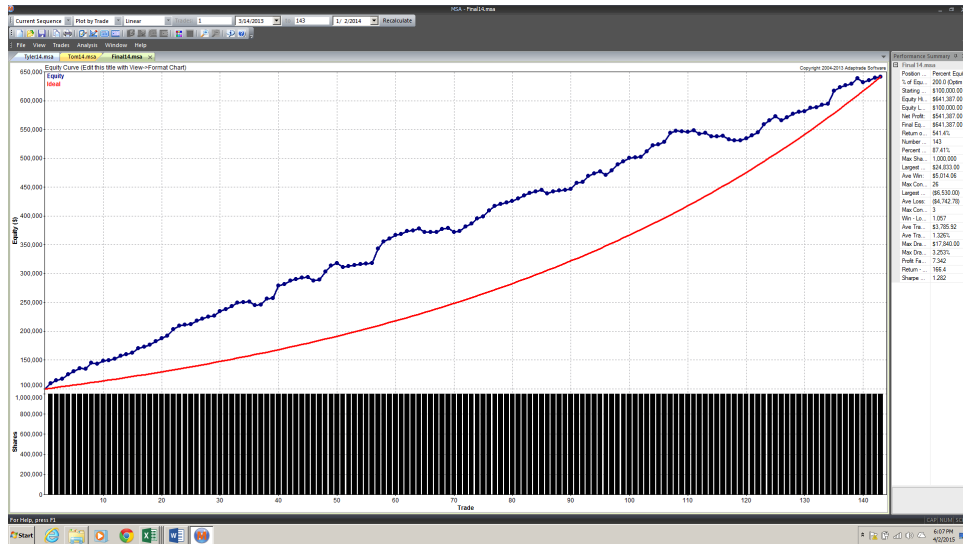


Figure 4.42: Monte-Carlo Equity Curve With Position Sizing Optimization

#### 4.4.5 Walk Forward

Walk Forward analyses are used to see how a system will work with unknown data with its parameters changing in order to see if the parameters are good for an extended period of time. In the figure below shows the WFA results for the System of Systems which shows that every WFA passed. The one highlighted in blue is the one selected by the analysis tool as the best WFA.

OOS% \	5	10	15	20	25	30
10	PASS **	PASS	PASS **	PASS **	PASS **	PASS
15	PASS	PASS **	PASS **	PASS **	PASS **	PASS
20	PASS	PASS **	PASS **	PASS **	PASS	PASS
25	PASS	PASS **	PASS	PASS	PASS	PASS
30	PASS	PASS **	PASS	PASS	PASS	PASS

Figure 4.43: System Of Systems Cluster Walk Forward Analysis

Walk-Forward Analysis Results : OOS=15% WFRuns=15			
Symbol: GBPCAD_Daily		Strategy: Ifinalcombo1	
	Test Criteria	Result	Comment
1	Overall Profitability	Pass	Total Profit > 0. System is likely to perform profitable on unseen data
2	Walk-Forward	Pass **	Walk-Forward Efficiency >= 100%. System is likely to future at a rate similar to those achieved during
3	Consistency of	Pass **	80%+ of walk-forward runs were profitable. System is most likely to be successful in future.
4	Distribution of	Pass	No individual time period contributed more than 50% of Total Net Profit.
5	Maximum	Pass	No individual run had a drawdown of more than 40% of initial capital.
	OVERALL RESULT	PASS **	Walk-Forward Efficiency >= 0%. System is likely to

Figure 4.44: System Of Systems Individual Walk Forward Analysis

A look at the walk forward result highlighted in blue shows the figure above shows what is needed in order to pass a walk forward. First and most obvious is to generate a profit, next is that the walk forward efficiency is greater or equal to 50% which shows that in the future it will run at as well as 50% the rate of the walk forward. Then it sees if it in the entire walk forwards that it is profitable in at least 50% of them. This is to ensure that with a wide range of parameters the system is still profitable. The next two criteria are to see is to ensure that one single time frame of the run contributed to more than 50% of the profit or 40% of the drawdown. Overall all these criteria are used to ensure that the system will not only be profitable but be profitable consistently over time. As shown by the WFA the system of systems seems to have a set of parameters that will last for a long time before needing to be recalculated and that it will be profitable in the future.

#### 4.4.6 Optimization

Below is a result of using the individual system parameters for the system of systems parameters compared to the performances of the system individually using their optimized parameters over the same time period. As can be



seen the system of systems vastly outperforms the base systems individually. The combination of the all three systems even outperforms have the base systems running at the same time. Due to this staggering result without optimizing the system of system it felt best not to optimize the parameters for the system of system for fear of curve fitting.

TradeStation Performance Summary <span>Collapse ^</span>			
	All Trades	Long Trades	Short Trades
Total Net Profit	\$52,120.51	\$40,408.74	\$11,711.76
Gross Profit	\$61,928.23	\$46,127.79	\$15,800.43
Gross Loss	(\$9,807.72)	(\$5,719.05)	(\$4,088.67)
Profit Factor	6.31	8.07	3.86

Figure 4.45: System of Systems

TradeStation Performance Summary <span>Collapse ^</span>			
	All Trades	Long Trades	Short Trades
Total Net Profit	\$7,820.63	\$4,347.10	\$3,473.52
Gross Profit	\$9,682.25	\$4,756.54	\$4,925.71
Gross Loss	(\$1,861.63)	(\$409.44)	(\$1,452.18)
Profit Factor	5.20	11.62	3.39

Figure 4.46: Overbought and Oversold System

TradeStation Performance Summary <span>Collapse ^</span>			
	All Trades	Long Trades	Short Trades
Total Net Profit	\$12,816.15	\$13,436.52	(\$620.38)
Gross Profit	\$15,894.68	\$15,894.68	\$0.00
Gross Loss	(\$3,078.53)	(\$2,458.16)	(\$620.38)
Profit Factor	5.16	6.47	0.00

Figure 4.47: Voting System

TradeStation Performance Summary				Collapse ^
	All Trades	Long Trades	Short Trades	
Total Net Profit	\$7,979.39	\$7,979.39	\$0.00	
Gross Profit	\$11,185.72	\$11,185.72	\$0.00	
Gross Loss	(\$3,206.33)	(\$3,206.33)	\$0.00	
Profit Factor	3.49	3.49	n/a	

Figure 4.48: Stochastic and Weighted Average System

#### 4.4.7 Future Work

Overall the system of systems performed beyond expectations thus there are little are where improvement can be made without attempting to curve fit the system. One of these areas could be improving the recognition of trending and non-trending areas more than just relying on the ADX. Another would just improving the transitions from the trending to non-trending part of the system and vice versa. The group was not really able to figure out ways to accomplish these two areas thus while they could help the system they could in fact hurt it.

## 5. Conclusions & Recommendations

### 5.1 Conclusions

In the beginning of this project each member had a minimal amount of experience in the world of trading and investment. The group learned from the ground up the basics. Experimentation of what did and did not work occurred and the group learned from these experiences. The accumulation of these experiences evolved into three systems a Support and Resistance system called the Overbought and Oversold System, and two trending systems called the Voting System and the Stochastic and Weighted Average System. Through optimization these systems were improved upon and then finally combined into a single system of systems.

From the Overbought and Oversold System to the Polling System each time showed great results supporting the fact that the system would be profitable in the future. From calculating the expectancy, expectunity, and system quality of each system to see how the system performed currently. To doing Monte Carlo simulation and Walk forward analyses to see how the system would perform in the future. Each time a result reinforcing the idea that the system was good was shown. While those individual systems worked separately well when they were combined into a single system of systems they performed beyond expectations. In which the system of systems blew past the systems separately in performance in back testing and in every analysis tool used to quantify a system.

## 5.2 Recommendations

If further work on this system of system is continued by another group or an individual a few key facts are important. First, the best input parameters found can be found in the appendix, and the system works best on daily charts. Secondly, due to some time constraints there was not enough time to research all aspects of the system to make it fully optimized.

One of these areas that need more research into is to find the specific properties an asset needs to show in order for the system to work at peak efficiency. Using back testing in TradeStation the system worked best from 2013-2015 on GBPCAD, but the group never delved deeply into the exact reasons for this. It would also important to find if the parameters that make the system work well in the forex market are the same for the stock market.

Another important area to research is other trending systems in general. The system of systems makes use of the Voting Trend Following System in order to make trades. This section of the trading system for the most part made use of the most common trending systems. From this it could safely be said that using other trending systems in the voting system could yield better results than shown in this report.

# Appendix A: Bibliography

- [1] J. Bollinger, *Bollinger bands introduction*, <http://www.bollingerbands.com>, Accessed: 4/29/2015.
- [2] I. LLC, *Investopedia*, <http://www.investopedia.com/>, Accessed: 4/29/2015.
- [3] *Trading as a Buisness*. Charlie Wright, 1998.
- [4] *Trading rules that work: The 28 essential lessons every trader must master*. John Wiley & Sons, 2007.
- [5] B. LLC, *Babypips.com, the beginners guide to forex trading*, <http://www.babypips.com/>, Accessed: 4/29/2015.
- [6] A. Software, *Trading software for monte carlo analysis : Adaptrade software*, <http://www.adaptrade.com/MSA/montecarlo.htm>, Accessed: 4/12/2015.

# Appendix B: System Code

## B.1 Overbought Oversold System

```
inputs:
    Barsback(20),
    Pipvalue(0),
    Overboughtlvl(0.84),
    Oversoldlvl(0.131),
    Targetprof(500),
    maximumloss(100);
Variables:
    Supp(0), Resis(0), Supp2(0), Resis2(0), SuppDist1(0),
        SuppDist2(0), ResistDist1(0), ResistDist2(0), OBOSLevel(0), Range1(0),
        Range2(0), Currentprice(0), Pipthing(0), Exitprofitlong(0), Exitprofitshort(0),
If Pipvalue = 0 then begin
    Pipthing = 0.0001;
end
Else begin
    pipthing=0.01;//forex with 0.01 pip
end;

//Support & Resistance Level Calculations
Supp = Lowest(Low, Round(barsback * 0.5, 0));
Resis = Highest(High, Round(barsback * 0.5, 0));
Supp2 = Lowest(Low, barsback);
Resis2 = Highest(High, barsback);

//% Distance from Support Level Calculations
SuppDist1 = (Close - Supp) / Close;
```

```

SuppDist2 = (Close - Supp2) / Close;

//% Distance from Resistance Level Calculations
ResistDist1 = (Close - Resis) / Close;
ResistDist2 = (Close - Resis2) / Close;

//Range Between Support & Resistance Level Calculations
Range1 = AbsValue(SuppDist1) + AbsValue(ResistDist1);
Range2 = AbsValue(SuppDist2) + AbsValue(ResistDist2);
//Overbought/Oversold Level Calculation
OBOSLevel = (((AbsValue(SuppDist1) / Range1) + (AbsValue(SuppDist2) / Range2)) * .

If OBOSLevel < Oversoldlvl and stayoutoflong < 90 then begin
  Buy ( "Long Entry" ) 100000 shares next bar at market ;
  Stayoutoflong= Stayoutoflong+1;
  stayoutofshort=0;
End
Else if OBOSLevel > Overboughtlvl and stayoutofshort<90 then begin
  Sellshort ("Short Entry") 100000 shares next bar at market;
  stayoutofshort= stayoutofshort+1;
  stayoutoflong=0;
End;

SetStopPosition;
Setprofittarget(Targetprof);
Setdollartrailing(Maximumloss);

```

## B.2 Stochastic System

```

Inputs:
HighPrice ( High ) ,
LowPrice ( Low ) ,
SmoothFKFD ( 45 ) ,
SmoothFDSD ( 8 ) ,
StochasticL ( 14 ) ,
WeightLength1 ( 6 ) ,
WeightLength2 ( 6 ) ,

```

```
ClosePrice ( Close );
```

```
Variables:
```

```
oFastK ( 5 ),  
oSlowK ( 5 ),  
oFastD ( 5 ),  
oSlowD ( 5 ),  
ValueStochastic(0),  
SmoothType ( 1 ), // Enter 1,2  
Oversold (20),  
Overbought (80),  
width (5),  
STPLOSS (0),  
hello(0);
```

```
ValueStochastic = Stochastic( HighPrice, LowPrice, ClosePrice, StochasticL, Smooth
```

```
If Waverage(Open, WeightLength1) > Waverage(Open[WeightLength1], WeightLength2) th
```

```
    If oSlowK Crosses Above oSlowD Then begin
```

```
        Buy 100000 Shares Next Bar at Market;
```

```
        STPLOSS = Lowest(Low,10);
```

```
    end;
```

```
If Marketposition = 1 then begin
```

```
    sell 100000 shares next bar at STPLOSS stop;
```

```
    If oSlowK Crosses Below oSlowD Then
```

```
        Sell 100000 Shares Next Bar at market ;
```

```
    end;
```

```
end;
```

```
If Waverage(Open, WeightLength1) < Waverage(Open[WeightLength1], WeightLength2) th
```

```
If oSlowK Crosses below oSlowD Then begin
```

```
    Sell Short 100000 Shares Next Bar at Market;
```

```
    STPLOSS = Lowest(Low,10);
```

```
    end;
```

```
If Marketposition = 1 then begin
```

```
    Sell 100000 shares next bar at STPLOSS stop;
```

```
    If oSlowK Crosses above oSlowD Then
```

```
        Buy 100000 Shares Next Bar at market ;
```

```
    end;
```



End;

## B.3 Voting System

// Primary execution enviroment for hybrid strategy

Inputs:

{ \_\_DMAADXSTRFUNCT parameters }

\_ADX\_MAV\_ADX\_LENGTH (11),  
\_ADX\_MAV\_ADX\_CUTOFF (20),  
\_ADX\_MAV\_Fast\_Length ( 6) ,  
\_ADX\_MAV\_Slow\_Length ( 13) ,  
\_ADX\_MAV\_AV\_TYPE (1),

{ \_\_TREND\_BOLINGER\_BANDS parameters}

\_TRND\_BOL\_LEN (16),  
\_TRND\_BOL\_DEVUP (1),  
\_TRND\_BOL\_DEVDWN (1),

// \_\_MACDFun

\_\_MACD\_SHORT (12),  
\_\_MACD\_LONG (26),  
\_\_MACD\_LEN (9),

{ weighting values for various strategies }

ADX\_MAV\_WEIGHT (1),  
TRND\_BOL\_WEIGHT (2),  
MACD\_Weight (1),

{ Overarching strategy parameters }

Certainty\_cutoff (0),  
PERTRAILSTOP (30),  
STOPLOSS (1000),

```

TRAILSTOPSTART (140),
Position_Size (100);

Variables:
__ADX_MAV_Opinion (0), // opinion of the __DMAADXSTRFUNCT strategy
__TRND_BOL_Opinion (0),
__MACD_Opinion (0),
Overarching_opinion (0),
hello(0); // hybrid opinion value

Overarching_opinion = 0; // clear previous opinions ?? Use average of previous opin

// poll functions
__ADX_MAV_Opinion = __DMAADXSTRFUNCT(_ADX_MAV_Slow_Length, _ADX_MAV_Fast_Length, _
__TRND_BOL_Opinion = __TREND_BOLINGER_BANDS ( _TRND_BOL_LEN, _TRND_BOL_DEVUP, _TRM
__MACD_Opinion = __MACDFun(__MACD_SHORT, __MACD_LONG, __MACD_LEN);
if ADX(11) > 30 then
    Overarching_opinion = ADX_MAV_WEIGHT * __ADX_MAV_OPINION + TRND_BOL_WEIGHT * __TR

If AbsValue( Overarching_opinion ) > certainty_cutoff then begin // Include some a
    If Overarching_opinion > 0 Then
        Buy Position_Size Shares Next Bar at Market ;
    If 0 > Overarching_opinion Then
        Sell Short Position_Size Shares Next Bar at market ;// {
end;

// handle stop losses!!
SETSTOPPOSITION;
SetStopLoss(STOPLOSS);
Setpercenttrailing(TRAILSTOPSTART, PERTRAILSTOP);

```

## B.4 Final

```
// Primary execution enviroment for hybrid strategy
```

Inputs:

```
{ __DMAADXSTRFUNCT parameters }

ADX_MAV_ADX_LENGTH (11),
ADX_MAV_ADX_CUTOFF (20),
ADX_MAV_Fast_Length ( 6) ,
ADX_MAV_Slow_Length ( 13) ,
ADX_MAV_AV_TYPE (1),

{ __TREND_BOLINGER_BANDS parameters}
TRND_BOL_LEN (16),
TRND_BOL_DEVUP (1),
TRND_BOL_DEVDWN (1),

// __MACDFun

MACD_SHORT (12),
MACD_LONG (26),
MACD_LEN (9),

// Support and Resistance parameters
Barsback(14),
Pipvalue(0),
Overboughtlvl(0.84),
Oversoldlvl(0.131),
Targetprof(1500),
maximumloss(180),
Trendingcutoff(30),

{ __STOCH_TRND parameters }

STOCH_TRND_SmoothFKFD ( 45 ) ,
STOCH_TRND_SmoothFDS ( 8 ) ,
```

```

        _STOCH_TRND_StochasticL ( 14 ),
        _STOCH_TRND_WeightLength1 ( 6 ),
        _STOCH_TRND_WeightLength2 ( 6 ),

{ weighting values for various strategies }
ADX_MAV_WEIGHT (1),
TRND_BOL_WEIGHT (2),
MACD_Weight (1),
STOCH_TRND_Weight (1),

{ Overarching strategy parameters }
Certainty_cutoff (0),
PERTRAILSTOP (30),
STOPLOSS (1000),
TRAILSTOPSTART (140),
Position_Size (100000)
;

Variables:
__ADX_MAV_Opinion (0), // opinion of the __DMAADXSTRFUNCT strategy
__TRND_BOL_Opinion (0),
__MACD_Opinion (0),
__STOCH_TRND_opinion (0),
istrending(0),
Supp(0),
Resis(0),
Supp2(0),
Resis2(0),
SuppDist1(0),
SuppDist2(0),
ResistDist1(0),
ResistDist2(0),
OBOSLevel(0),
Range1(0),
Range2(0),
Currentprice(0),
Pipthing(0),

```

```

Exitprofitlong(0),
Exitprofitshort(0),
Exitlossshort(0),
Exitlosslong(0),
stayoutofshort(0),
Stayoutoflong(0),
Overarching_opinion (0),// hybrid opinion value
hello(0); // writing trades list

Overarching_opinion = 0; // clear previous opinions ?? Use average of previous opin

// poll functions
__ADX_MAV_Opinion = __DMAADXSTRFUNCT(_ADX_MAV_Slow_Length, _ADX_MAV_Fast_Length, _
__TRND_BOL_Opinion = __TREND_BOLINGER_BANDS ( _TRND_BOL_LEN, _TRND_BOL_DEVUP, _TRM
__MACD_Opinion = __MACDFun(__MACD_SHORT, __MACD_LONG, __MACD_LEN);
__STOCH_TRND_opinion = __STOCH_TRND(_STOCH_TRND_SmoothFKFD, _STOCH_TRND_SmoothFDSD
if ADX(11) > Trendingcutoff then begin
    Overarching_opinion = ADX_MAV_WEIGHT * __ADX_MAV_OPINION + TRND_BOL_WEIGHT * __TR
    istrending=1;
end
Else begin
    istrending=0;
end;
//
//Support & Resistance Level Calculations
Supp = Lowest(Low, Round(barsback * 0.5, 0));
Resis = Highest(High, Round(barsback * 0.5, 0));
Supp2 = Lowest(Low, barsback);
Resis2 = Highest(High, barsback);

//% Distance from Support Level Calculations
SuppDist1 = (Close - Supp) / Close;
SuppDist2 = (Close - Supp2) / Close;

//% Distance from Resistance Level Calculations
ResistDist1 = (Close - Resis) / Close;
ResistDist2 = (Close - Resis2) / Close;

```

```

//Range Between Support & Resistance Level Calculations
Range1 = AbsValue(SuppDist1) + AbsValue(ResistDist1);
Range2 = AbsValue(SuppDist2) + AbsValue(ResistDist2);
//Overbought/Oversold Level Calculation
OBOSLevel = (((AbsValue(SuppDist1) / Range1) + (AbsValue(SuppDist2) / Range2)) * .

If OBOSLevel < Oversoldlvl and stayoutoflong < 9 and ADX(11) < Trendingcutoff then
  Buy ( "Long Entry" ) Position_Size shares next bar at market ;
  Stayoutoflong= Stayoutoflong+1;
  stayoutofshort=0;

End
Else if OBOSLevel > Overboughtlvl and stayoutofshort<7 and ADX(11) <Trendingcutoff
  Sellshort ("Short Entry") Position_Size shares next bar at market;
  stayoutofshort= stayoutofshort+1;
  stayoutoflong=0;

End;

If AbsValue( Overarching_opinion ) > certainty_cutoff then begin // Include some a
  If Overarching_opinion > 0 Then
    Buy Position_Size Shares Next Bar at Market ;
  If 0 > Overarching_opinion Then
    Sell Short Position_Size Shares Next Bar at market ;// {
end;

// handle stop losses!! trending
If istrending=1 then begin
  SETSTOPPOSITION;
  SetStopLoss(STOPLOSS);
  Setpercenttrailing(TRAILSTOPSTART, PERTRAILSTOP);
End
Else begin
  SetStopPosition;
  Setprofittarget(Targetprof);
  Setdollartrailing(Maximumloss);
end;

```

```
//hello=WriteTrades32(640,0,0,14,1,"F:\Trades\final14.csv");
```

## B.5 Functions

### B.5.1 Moving Average

```
{
function version of my __ADX_W_2_MAVG strategy
returns 1 if strategy believes longs are good
returns -1 if strategy believes shorts are good
returns 0 if the strategy deosn't have a opinion
}
inputs:
    AverageLongLength (NUMERIC),
    AverageShortLength (NUMERIC),
    ADXLength (NUMERIC),
    ADXCutoff (NUMERIC),
    AverageType (NUMERIC) ;

Variables:
    longAverage (0),
    shortAverage (0),
    ReturnValue (0);

{reset return value}
ReturnValue = 0;

{If we want to caluculate a opionion}
If (ADX(ADXLength) > ADXCutoff) Then begin
{ Calculate average according to type }
    if AverageType = 0 then begin
        longAverage = Average ( Close , AverageLongLength ) ;
        shortAverage = Average ( Close , AverageShortLength ) ;
    end;
```

```

If AverageType = 1 then begin
    longAverage = XAverage ( Close , AverageLongLength ) ;
    shortAverage = XAverage ( Close , AverageShortLength ) ;
end;
If AverageType = 2 then begin
    longAverage = WAverage ( Close , AverageLongLength ) ;
    shortAverage = WAverage ( Close , AverageShortLength ) ;
end;
{ Determine position based on type }
If shortAverage > longAverage Then { fast crossed over / is above slow }
    ReturnValue = 1;
If shortAverage < longAverage Then { vice versa (probably could just be else) }
    ReturnValue = -1;
end;

{ else }
{ ADX is less than cutoff, do nothing }
__DMAADXSTRFUNCT = ReturnValue;

```

## B.5.2 MACD

INPUTS:

```

Fast(numeric),
slow(numeric),
length(numeric);

```

variables:

```

md (0),
mdav (0),
mddiff(0),
ret (0);

```

```

md = MACD( Close, Fast, slow ) ;
mdav = XAverage( md, length ) ;
mddiff = md - mdav ;

```

```

if( Currentbar > 2 and mddiff > 0) then

```



```

    ret = 1;
if( Currentbar > 2 and mddiff < 0) then
    ret = -1;

__MACDFun = ret;

```

### B.5.3 Bollinger Bands

```

{
function version of a bolinger band breakout strategy
returns 1 if strategy believes longs are good
returns -1 if strategy believes shorts are good
returns 0 if the strategy deosn't have a opinion
}
inputs:
    Length( NUMERIC ),
    NumDevsUp( NUMERIC ) ,
    NumDevsDn( NUMERIC );

// vars
variables:
    LowerBand( 0 ),
    UpperBand( 0 ),
    Middle (0),
    val (0); { cross of this price under UpperBand triggers placement ;
              of stop order at UpperBand }

// compute bolinger bands
UpperBand = BollingerBand( Close, Length, NumDevsUp ) ;
LowerBand = BollingerBand( Close, Length, -NumDevsDn ) ;
Middle = BollingerBand(Close, Length, 0);

// reset the number if the opinion is reversed (persist opinion until end)
{
if ((val < 0) and close > Middle)
    Or

```

```

((val > 0) and close < Middle) then //{
    val = 0;

if Currentbar > 2 then begin
    if close < LowerBand then val = -1;
    If Close > UpperBand then val = 1;

end;

__TREND_BOLINGER_BANDS = val;

```

#### B.5.4 Adaption Of Stochastic System

Inputs:

```

SmoothFKFD ( NUMERIC ) ,
SmoothFDSD ( NUMERIC ) ,
StochasticL ( NUMERIC ) ,
WeightLength1 ( NUMERIC ) ,
WeightLength2 ( NUMERIC );

```

Variables:

```

oFastK ( 1 ),
oSlowK ( 1 ),
oFastD ( 1 ),
oSlowD ( 1 ),
ValueStochastic(0),
SmoothType ( 1 ), // Enter 1,2
Oversold (20),
Overbought (80),
width (5),
STPLOSS (0),
retrn (0),
HighPrice ( High ) ,

```

```

LowPrice ( Low ),
ClosePrice ( Close );

```

```

HighPrice = ( High ) ;
LowPrice = ( Low ) ;
ClosePrice = ( Close );

```

```

ValueStochastic = Stochastic( HighPrice, LowPrice, ClosePrice, StochasticL, Smooth

```

```

If Waverage(Open, WeightLength1) > Waverage(Open[WeightLength1], WeightLength2) th

```

```

    If oSlowK Crosses Above oSlowD Then begin

```

```

        retrn = 1;

```

```

        STPLOSS = Lowest(Low,10);

```

```

    end;

```

```

If retrn = 1 then begin

```

```

    //sell 100000 shares next bar at STPLOSS stop;

```

```

    If oSlowK Crosses Below oSlowD Then

```

```

        retrn = -1;

```

```

    end;

```

```

end;

```

```

If Waverage(Open, WeightLength1) < Waverage(Open[WeightLength1], WeightLength2) th

```

```

If oSlowK Crosses below oSlowD Then begin

```

```

    retrn = -1;

```

```

    STPLOSS = Lowest(Low,10);

```

```

    end;

```

```

If retrn = 1 then begin

```

```

    //Sell 100000 shares next bar at STPLOSS stop;

```

```

    If oSlowK Crosses above oSlowD Then

```

```

        retrn = 1;

```

```

    end;

```

```

End;

```

```

__STOCH_TRND = retrn;

```

# Appendix C: Journals

## C.1 Tyler's Journal

### Week 8/30-9/4

- Downloaded Tradestation
- Watched some of the tutorial videos made by Tradestation
- Tried to buy some stocks got an error that it couldn't be routed. It might have occurred since I was trying buy after the market had closed.
- Was able to buy some USDJPY but I closed the trade instantly since I do not really know the basics of trading.
- Subscribed to the Investing subreddit on Reddit.com in order to follow important news.

### Week 9/4-9/11

- Tried to set a limit buy order for IBM by setting it 180 per share. It canceled itself after the night.
- Watched more videos
  - Found and tested the order placement from this video but couldn't get it to work <https://www.youtube.com/watch?v=w9AtJU1ZTxk> "Advanced Order Placement in Tradestation"
  - Watched more educational material on trading learned about different types of orders
  - Began look at easy language code by looking at premade codes
  - No trades occurred this week, read above the Fibonacci retracements don't see how they actually work

## Week 9/11-9/18

Trade 1 USDJPY 1 lot

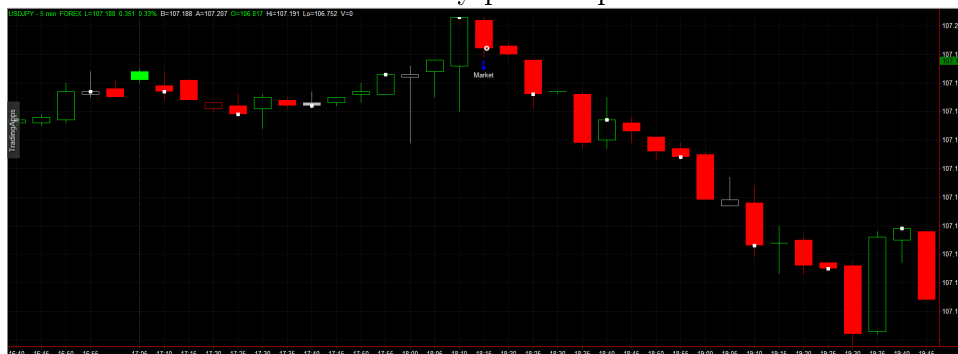
-Entered at market at 107.216

-Exited due to stop order which was set at 107.192.

-Loss of \$22.39.

My thoughts for entering this trade were that the overall trend was going to be the same as previous 20 bars. Such that even though I entered at market on a bar that closes lower than it opened it will eventually go back up and end up selling it when the price rose. However my main concern was to get out really quick if my trade was going to be a loss so I set a stop market at 107.192. Which activated seconds later since it was so close to what I entered in at. In hindsight this stop market did not really make sense since it would not even allow me to get a profit if the pattern did repeat since it would dip more than the first red bar then go back up above it. Thus the exit of my trade was not optimal for what I had in mind entering the trade, even though it actually saved me from a huge loss in the end.

What I learned from this is that I got to take a bigger risk because even though based on this chart this quick get out saved me in other cases it might hinder me by not allowing me to get a profit. So my acceptable loss for a trade should be high enough that it will protect me from a huge sudden downturn but allow it to keep running such that it can turn into a profit if the trend of the value of the currency pair is upward.



Trade 2 AUDUSD and GBPUSD 1 lot each

-Entered at 0.90448 for AUDUSD and 1.62456 for GBPUSD

-Exited at 0.90450 for AUDUSD and 1.62500 for GBPUSD

-Profit of \$46

09/15/14 10:49:58 PM	09/16/14 11:40:54 AM	AUDUSD	Sell	100,000	100,000	0	0.90450	0.90450	Filled
09/15/14 10:47:45 PM	09/16/14 11:53:28 AM	GBPUSD	Sell	100,000	100,000	0	1.62500	1.62500	Filled
09/15/14 10:39:51 PM	09/15/14 10:39:51 PM	GBPUSD	Buy	100,000	100,000	0	Market	1.62456	Filled
09/15/14 10:38:45 PM	09/15/14 10:38:45 PM	AUDUSD	Buy	100,000	100,000	0	Market	0.90448	Filled

I decided that I would buy into the GBPUSD and the AUDUSD currency pairs. I got into the GBPUSD because of the upcoming election for Scottish Independence. I did so because I wanted to see if I could get a profit still days before such an important event. While the AUDUSD I choose in order to make up for any loss I might incur from buying into the GBPUSD. Here is the list of the trades that occurred.

As shown above I entered in the markets at market value with a buy, and ended with a profit \$46. My strategy for opening the trade was to buy low. It was to buy at market late at night where I felt the average price during would be lower than the morning/mid/primetime parts of the day.

My exiting strategy while simple had a little more thought put into it. First, my strategy for exiting when I was at a loss was to manual sell it myself; I was prepared to do this if the losses was going to equal \$900 or greater in value mostly due to the constraints stated by the project. Second, I set sell limit orders above the price I bought in at in order to have a profit exit strategy, these values are shown in the figure above. I chose those values based on the fact that it would generate a profit. I did not choose to sell at higher prices fearing that it might have never reached that high which would force me to exit with a loss. Overall I left with a profit of 46 dollars which made me very happy that I set my limit sell order to a place that it could reach. Because from the point of buying to the when it was selling was making me stressed out do the dips in the prices making me feel that I need to get into auto trading quicker so I can become more objective. Looking back at the trades I should have sought more profit. Why should I close at a profit of \$46 for two trades when I'm willing to accept a loss of \$900 per trade? Profit is profit but if I used these entry and exit conditions in the long run I would have to win a lot more often than when I lose to even break even. Thus I should probably aim for a higher profit.



## Week 9/18-9/25

Trade 1 -EURUSD 1 lot

-Entered at 1.28552

-Exited at 1.28645

-Profit \$93

For my trade I bought one lot of EURUSD. I did this because I saw on forexlive and forexfactory there were two important pieces of information coming out that would have an effect on its value. First, it was the French Manufacturing PMI, and then the German Manufacturing and Services PMI. I saw that these were happening during the early morning of September 23, and since I did not want to wait until then to see if I should short I bought into the market the day before.

My rationale for this trade was that when I bought in the value of the currency was around the daily low values so I felt I could take a risk here. Since it will either bounce up in price depending on good news from those PMI number or it will drop. If it rises I get a good profit since I bought in so

low. If it dropped I could limit my losses since I entered at such a low value that my losses compared to other entering times would be smaller. Looking at the graph that I supplied the value of EURUSD was decreasing until 3AM then it started on an upturn. This was good since this occurred after the PMI numbers were released. Sadly, as you can also see I missed the point where I could make the most profit since I wasn't awake and I forgot to put a sell limit order in prior. I still managed to sell my currency for a profit of \$93.

Back to the news about the PMI number, the French manufacturing PMI came in at 48.8 which was an increase of 1.9 from the previous time. The German manufacturing one on the other hand dropped by 1.1 to 50.3 while the German services PMI increased by 0.6 to 55.4. A value of 50 or above meant that there was expansion in the sector while below 50 indicates contraction. This means that overall the value should increase since the values were good, and as stated above it did. Based off of news release found on forex factory "Markit Flash Eurozone PMI®" also defend this opinion that it is growing albeit at a slower rate than previous measuring of the PMI. To talk more about the German PMI I looked at the actual composite PMI release which stated it had ongoing expansion in the private sector but it is moving closer to manufacturing stagnation. This can be seen by how it dropped to 50.3. So overall it looks like if I did this same strategy the next time the PMI are released I would not get as lucky to have a profit since there could be stagnation at that time.

So overall my strategy was that I entered at night when the value of the currency was at a low point of the point. Then I waited for the forex news on French and Germany PMI number to come in. I then had two exit strategies. The first was if the PMI indexes were good which would make the value of EURUSD go up in value leading me to sell at a profit. While I missed the point where I could've made the most profit I still managed to get a profit of \$93. My other exit was if the PMI's were bad which in that case I would sell at a loss in hopes of missing an even bigger loss. A sell limit could have been used to set a fixed profit I wanted and a sell stop order could have been used to sell in case of a drop this are things I have to get more used to specifically the stop order loss I have to get more accustomed else in the future I might make too much of a loss on a single trade.





Trade 2 - USDJPY 2 lots

-Entered at 108.877

-Exited at 109.001

-Profit \$227.52

I started this trade since Japan's Flash Manufacturing PMI was coming out two hours after from now. So I decided to take a risk that it would be bad news which would make the USDJPY pair go up in value. So I entered in at market value which was 108.877. I was willing to risk around \$1000 so I set a stop market at 108.4 which would make me leave with a loss of \$880.07. I set a limit order to 109 exactly to be my exit for the when I'm at a profit.

During the trade I was a little worried since while the PMI value was lower than expected and down from August which I felt would have raised the value of USDJPY the PMI was still above 50 at 51.7 which means growth. Since it was a good result overall it meant that people would view the yen as strong thus the USDJPY value dropped as shown in figure 5. In the end it went back up and even hit my limit price which sent me out of the trade with a profit of \$227.52.

Looking back at the trade again I seemed to have entered at the beginning of a downturn. This does not seem to be optimal since the price is still high in the relative to the bars in the graph. I feel that entering at the start of an upward trend would be best since the difference between the buy and sell would be larger number of pips.



## Week 9/25-10/02

Trade 1 Microsoft 500 shares -Entered at 46.91 -Exited at 46.20 -Loss of \$360 I entered this trade since it was on a directionless trend. With the thought that it price would stay directionless overall and hopefully get a small profit on one of the highs bars. I was going to exit if my loss was around \$1000. So I set up a stop market, I was going to exit for profit manually by checking if was at profit currently. Due to other school work I was not able to check my trade during 9/24 market hours which made me miss areas where I could have exited with a profit. I ended up changing my exit for loss strategy on the 26th when I looked at the stocks on a larger time frame which should a clear downward trend which made me want to exit earlier than I originally set for my loss exit. Next time I should probably just let my stop order exit me. Since it is a better trading practice not to let emotions control our decision and change our strategy we set up prior. Also stocks might not be the best when I have classes and other work to do from 9-5 which will make it hard to manual trade stocks.



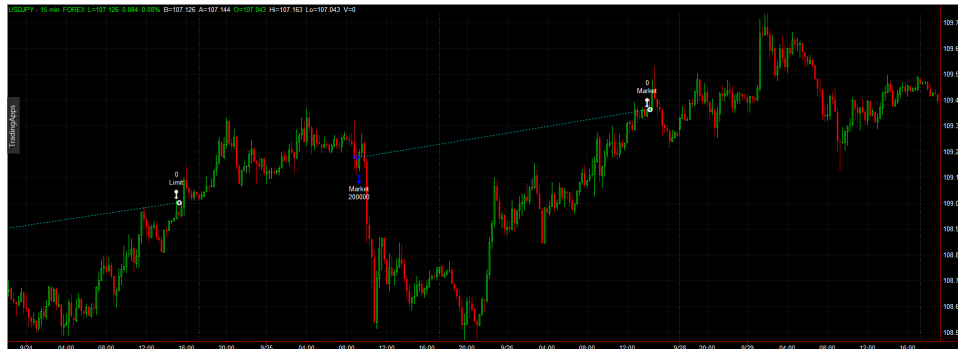
Trade 2 USDJPY 2 lots

- Entered at 109.178
- Exited at 109.362
- Profit of \$336.49

My reason for entering was that at the time the USDJPY was on an upward trend. Even though the trend has been going on for some time it was clear upward trend so I thought it would continue. So I bought 2 lots of USDJPY at market value. I then set a stop order at 108.2 in order to make sure my maximum loss was less than \$2000. I also set a limit of 109.362 in order as my exit for profit since a 200 pip increase I feel is good for a trade.

While soon after entered the value of USDJPY took a nose dive it did not activate my stop loss. This time compared to my Microsoft trade I was not going to change my strategy. In the end the value rose back up and my limit order activated and made me get a profit of \$336.49.

This trade shows merit to not changing your strategy mid trade. If I did was going to exit with a loss but I believed in my strategy this time and it paid off.



Trade 3 USDJPY 1 lot

- Entered at 109.356
- Exited at 109.642
- Profit of \$260.84

My trade this week was in the USDJYP. I came out with a profit of \$260.84. I decided to do my trade in the USDJYP due to the fact that I want to stay in one currency pair and I saw in my journal I have had the most success in USDJYP. My overall goal was to buy low and sell high. So for my trade my entry condition was to buy in during a downward trend. This would be a good place to do a short but I personally dislike shorting when doing manual trading. So as it can be seen in the graph below I did enter during a downward trend as seen by the "Three Black Crows" candlestick

pattern. My exit strategy originally was going to be a sell limit at 109.45, but before I entered I decided that making sure I do not incur a loss of 1% was more important. Thus I set up a stop market at 108.5 which if it was hit I would have exited with a loss of \$ 779.72. Other than my exiting strategy was to exit with a profit or exit during Wednesday night. In the end I exited with a profit. When I was exiting I was hoping for the upward trend to continue, but it did not so I exited with a profit after I confirmed the trend reversal.

My first article can be seen in the link below was ADP's National Employment Report. This report showed that in September in the US employment in the private sector increased by 213,000. This had an effect on the forex value of currencies pairs with the USD in them. Since, from a fundamental analysis view this strengthened the economy which strengthens the US dollar. The report states that this was the sixth consecutive month of over 200,000 jobs being added in the private sector which marks steady growth and is a positive sign for the economy. A point of worry was stated in the decline in job growth for medium sized businesses compared to small and large one which increased.

The second article I found was September 2014 Manufacturing ISM Report on Business. This report stated that the manufacturing sector expanded for the 16th consecutive month and the overall economy grew for the 64th consecutive month. The respondents stated this was cause the lowering of fuel-price that people are buying more at the convenience store level. While global political unrest is helping the defense industry, and also that "Overall, orders are at the strongest point this year." Once again from a fundamental analysis since this report states that the economy is growing then in turn it is strengthening the Dollar when compared the Yen would make one be able to buy more Yen with a Single dollar.



Trade 4 EURUSD 2 lots -Entered at 1.26884 -Exited at 1.267 -Loss of \$368

This trade was more of testing an idea I had in my head rather than a serious trade. In my previous trades my entering strategy was never really the big picture of my trade it was the exits that decided if the trade was profitable or not. So I bought in at market value during a downward trend. For my exit I set a stop market at 1.257 and a limit at 1.272. This would make me exit at a loss of \$2386 or at a profit of \$632. I chose these stop and limit value since I did not want to risk more than 1.2% of what I entered in with also I chose limit since it was a value that was reached during the downward trend prior so I felt I could use that as a bench for testing my idea.

In the end I decided to end this trade early since overall it proved my point and that a bad enter can lead to profit if the exits are good which is what I was using this trade as a test for. If I had set my limit 10 pips lower I would have exited with a profit. While I proved what I wanted to I feel this is a risky decision to enter trades like this. Since if you do get a point where you could exit with a profit you either had to set your limit order perfectly or you would have to be staring at the trade 24/7. One idea that could help this strategy might have been a trailing stop order which would protect part of my profit when it is on an upward trend.

While I entered at a bad time purposely there were points where profit could be made. Looking at the graph though entering at the start of an upward trend would yield a higher profit. So overall not caring about the entering of a trade is not a wise move even though you can make profit.



Strategies on babypips One strategy from babypips was the simple bounce Support and Resistance strategy. Where the entry would bounce off the Support or Resistance line and you would enter at a point a little after the bounce and also set a stop loss above the Support or Resistance line in case it breaks out. Ideally in this strategy the exit point would be at a point just above the opposite line (e.g. you bought in just above the support line after the bounce you would exit with a sell at a point just below the resistance line) since ideally the S and R lines wouldn't break. Since it is not ideal you would exit when there is a trend reversal or you hit your target profit, also it might be better to have a trailing stop order instead a stop loss order for limiting your loss. Another strategy I read on babypips was trading using the head and shoulders pattern, which shows that a trend reversal could be happening which can be used as an entry for a trade. Specifically I will talk about entering with an Inverse Head and Shoulder. The case for entering in the Inverse Head and Shoulder would be just above the Neckline after the last shoulder which you would then place a stop loss below the neckline price. The exit for this strategy would be to sell when the upward trend that should occur after the inverse head and shoulder ends. One way to do this is to look for a normal head a shoulder pattern and have your exit point be right before the neckline of the last shoulder. The reason the exit would be before the neckline is in order to maximize the profit. You can also make this work on shorting but the reverse would be applied. Other strategies include use of popular chart indicators, Fibonacci retracements, in conjunction with Support and Resistance. The strategy I talked about was just the basics, and only talked about the ideal. The use of the strategies above used with other indicators would help the effectiveness of the strategies in the non-ideal market. Week 10/2-10/9

Trade 1 USDJPY 1 lot -Entered at 109.150 -Exited at 108.600 -Loss of

\$506.44

The trade this week was once again in USDJPY. I came in with the goal of using 2 moving averages to mark my entry specifically a time after a cross where the purple line was below the cyan after the cross which is indicative of an upward trend and then exit at specified price for profit or loss. So as I switched the time intervals, and saw at the 30 minute interval the start of an upward trend so I entered in at market at 109.150. I set up my exit strategy to leave at a target price for profit and at a target for when I leave at a loss. I did this by setting a sell limit at 109.450 for my target profit price (profit of 274 Dollars), I also set up a stop market at 108.6 which would limit my loss to 506 dollars. In the end my stop market activated making me take a loss of \$506.44.



Trade 2 GBPUSD 1 lot

- Enter at 1.60901
- Exit at 1.60987
- Profit of \$86

In this trade I used the crossing of two moving averages to enter the market. Since I am manual trading still I accepted 8 bars after the cross also. Since that way I feel I can still catch some of the upward trend and make a profit. The reason this was on the five minute interval was as I changed the time trade around only at 5 minute interval was the fast average above the slow average (purple below the cyan). So I entered at market and decided for my exit strategy. I set a stop order at 1.60700 in order to make my maximum loss be \$201. I felt since I was in the short time frame, less risk was best. I also set a limit at 1.60978 since on such a small time frame it will quickly change from upward to downward and such so I did not want to

try for a huge profit. In the end my limit activated and I sold my GBPUSD at 1.60987 for a profit of \$86. Looking back at the trade I feel my limit price was a good choice since it did start a downward trend right after it. This in the end would have triggered my stop order so the lower the time frame is smaller maximum loss risk and profit gain I feel should be used. I feel this work well due to the noise that is clearly visible in the smaller time frames.



Trade 3 EURUSD 2 lots

- Enter at 1.26568
- Exit at 1.26700
- Profit of \$264

I choose this trade since while looking at EURUSD at different bar times with a 2 moving average indicator on to see for an upward trend that I can catch early. I saw that on the 30 minute interval that it was on an upward trend. So I entered in at market so I could ride on the upward trend for a profit at 1.26568. In the beginning I set up two exits, a sell limit and a sell stop market originally set at 1.26800 and 1.26000 respectively. However I made a mistake typing in my sell limit and I set it at 1.28. I only realized my mistake later at 11PM that night after it reached points where I thought I set it up to sell at. So I fixed my limit order price and went to bed. In the morning I was relieved that my fixed limit order had activated and I ended up with a profit of \$264. I learned from this trade that I should double check my limit and stop market prices. Since I rather not hope for it to go back up after it reached a price it should have exited at.





## Week 10/9-10/17

Trade 1 GBPUSD 1 lot

-Entered at 1.61310

-Exited at 1.59829

-Loss of \$1481

Once again I was using the crossing of the fast moving average above the slow moving average as the entry strategy. So I entered in the GBPUSD at 1.61310. I expected the upward trend to last just as long as the previous downward trend so I set my limit order at 1.615, and I set a stop order at 1.6 to limit my losses. When the trade finally closes it stopped at 1.59829 which made me incur a loss of \$1481 dollars. Overall this trade helped me realize that I probably should confirm the trend before entering. Since if I checked to see if the bar after the crossing of the averages closed higher than the previous one then this might give more proof that this will be an upward trend. Since in this trade it did cross so I entered but in the end it was directionless.



### Trade 2 USDCHF

- Entered at 0.95479
- Exited at 0.95700
- Profit of \$221

This time I made it so that I confirmed the trend that should occur when the fast moving average crosses above the slow average (thought of confirming trend after I saw that GBPUSD was directionless). After I felt that the upward trend was confirmed I entered the market at 0.95479. Then I set a stop order at 0.95 which would minimize my maximum losses to \$479. I then also set my limit order to 0.95700 which if activated would exit me out of the trade with a profit of \$221. As you can see in the graph the limit order activated and I exited with a profit.



Those were the last trades that stopped before 10/15.

### Week 10/28-11/2

No trades were done since it was the first week back from break. Being the first week back from break we had to present a power point of a trading system back tested from 11/1/2013 about how it worked and what needs to be worked on. I used the system I made in A term. Here is the key information of the system:

- Enters long (3 lots) the bar after the fast EMA crosses above the slow EMA
- Enters short (3 lots) the bar after the fast EMA crosses below the slow EMA
- Exits for a profit if trade reaches target limit order

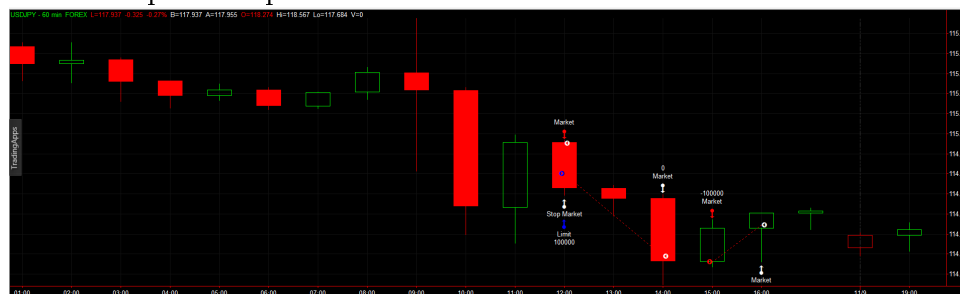
- Exits for a loss if trade reaches target stop order
- Short position Exit orders
- Limit order set to the lowest of the lows of the previous 10 bars from entering
- Stop order set to highest of the highs of the previous 10 bars from entering
- Long position Exit orders
- Limit order set to highest of the highs of the previous 10 bars from entering
- Stop order set to lowest of the lows of the previous 10 bars from entering
- Tested on USDJPY
- Profit Factor of 3.13
- 13 Winning trades, 3 Losses
- Average winning trade \$2648.04
- Average Losing trade \$3,661.32
- Annual rate of return 12.91%

Overall my short trades were better than my longs, but more importantly my stop order was never reached which is a bad thing overall since it only exited from my stop order I would've lost more money and my average losing trade was already bigger than my winning trade. Next week I plan on making this strategy have a constant stop loss of \$1000 with the goal of making my average winning trade be larger than my average losing trade.

## **Week 11/3-11/9**

Three trades occurred. Analysis Looking at daily charts of USDJPY and EURUSD I see two big things. For the USDJPY I see that there is clearly a strong upward trend leading into this week. I will set up my auto system from last week on this chart at a 4 hour chart in order to make use of this

trend. On the EURUSD side I see that on the daily it is clearly a downward trend coming into this week so I might be able to get a short on this pair during the week. On a lower time scale of 1 hour the EURUSD shows that some small profit ( 40 pips) long trades are very possible currently if the current trend continues since during the day there are upwards of around 40 pips. For the USDJPY the consensus is to stay long since it also shows very strong uptrends coming into this week. I am also going to have a few other charts with other USD or JPY pairs to watch hoping to find a good time to enter in those pairs as well. Auto Trades I set my auto strategy run on USDJPY this week with confidence that it would worked correctly like it has shown in back testing. What occurred though showed that the back testing on a higher timeframe only made it appear to work correctly. You can see the code of this broken version in appendix B. The strategy took 3 trades 2 shorts and 1 long and all three were losses. While it was supposed to leave at loss of \$1000 it did not in the slightest do that instead it seemed to leave at some random intervals. When I noticed it was actually not working I took the system off. In the end those three trades made me lose \$529.59. I am going to fix this by next week I currently think that it might have to do with where the stop loss is placed.



### Manual Trade

- Entered long with 1 lot at 1.24185
- Exited at 1.24286
- Profit of \$101

This trade was the start of my manual trading strategy that I will be using for the following weeks to see how well it works. Its overall idea is to find \$100 in profit or a max loss of \$50 per trade of 1 lot if I'm trading an xxxUSD pair. My set up will be if my EMA's both fast and slow are both moving upward or downward and my entry will be if it seems to have hit a support or resistance level at most 15 bars back. Using this strategy if I make a profit I'm taking a 5% return while only risking at most 2.5% of the

\$2000 dollar required to get 1 lot of an xxxUSD pair with leverage of 50:1. I will be doing this by the use of a trailing stop set 5 pips below the entering state and the use of a limit order set to 10 pips above my entering price.

This week I found a good time to test this strategy on Friday since I saw that my EMA's were telling me it was still in an upward trend which was my set up, and also it looked like it bounced off of a support level 6 bars before which told me to enter now. So I set my limit and trailing stop like stated above and watched what happen. In the end I made \$101 dollars.



Next week I will be continuing this system but instead of only going 10 pips above for profit and 5 below I will be using 100 and 50 pips since in reality I was think of using these values but I forgot tradestation shows the fractional pip.

1	Sell	11/07/14	11:06:17	SIM663853X	USDJPY	¥114.94	0.00	100000	(\$9.60)	(0.01%)	\$608.00	98.45%	\$0.00
	Buy	11/07/14	11:22:02	SIM663853X	USDJPY	¥114.95			(\$9.60)		(\$9.60)	0.00%	\$0.00
2	Buy	11/07/14	11:23:12	SIM663853X	EURUSD	\$1.24	0.00	100000	\$101.00	0.08%	\$101.00	100.00%	\$0.00
	Sell	11/07/14	12:12:57	SIM663853X	EURUSD	\$1.24			\$91.40		\$0.00	100.00%	\$0.00
3	Buy	11/07/14	11:47:05	SIM663853X	USDJPY	¥114.80	0.00	100000	(\$359.46)	(0.36%)	\$0.00	0.00%	\$0.00
	Sell	11/07/14	13:40:46	SIM663853X	USDJPY	¥114.39			(\$359.46)		(\$359.46)	0.00%	\$0.00
4	Sell	11/07/14	14:00:01	SIM663853X	USDJPY	¥114.36	0.00	100000	(\$160.54)	(0.16%)	\$101.19	38.67%	\$0.00
	Buy	11/07/14	15:00:01	SIM663853X	USDJPY	¥114.55			(\$428.59)		(\$160.54)	0.00%	\$0.00

	<b>All Trades Long TradesShort Trades</b>		
Total Net Profit	(\$428.59)	(\$258.46)	(\$170.13)
Gross Profit	\$101.00	\$101.00	\$0.00
Gross Loss	(\$529.59)	(\$359.46)	(\$170.13)
Profit Factor	0.19	0.28	0.00

## Week 11/10-11/16

Analysis This week in the analysis I see that the Yen is still week overall. So this week I am more closely looking at XXXJPY charts for longs with the feeling that the Yen will continue being weak for at least a few more days. I am also looking at pairs with the Dollar since there is a lot talk of US economy doing best compared to other currencies currently.

Trade of the week

- AUDJPY
- Entered at 101.65 at 11/14/14 at Noon
- Exited at 102.157 at 11/16/14 at 7:01:22PM
- Profit of \$434.79

For my manual trade this week I continued the manual strategy used last week with some modifications. A quick review of what the strategy was it had a set-up telling me an entry could be occurring when both the Slow(34) and Fast(9) Exponential moving averages are going in the same direction, for example both going upward is a set up for a long while both down is set up for a short. Next the entry was if it hit a support or resistance level and has bounced back up in the previous 10 bars. Then to exit I made use of a limit 100 pips above the entry and a trailing stop order 50 pips below the entry. Last week I erroneously used 10 and 5 pips respectively due to forget tradestation shows a fractional pip.

This week's trade was in AUDJPY since it was the first of the 16 charts I was looking at that had met my setup and entry conditions. So in entered and set my limit 100 pips above and my trailing stop 50 pips below from when I entered. In the end my trailing stop activated and I exit with a profit of 434.79

For next week I will be continuing this trade and I also will be adding the new previous day high and day low indicator to the strategy to see how it affects my strategy. I'm hoping that it will help find better entry's for my strategy.



Overall

List of trades

1	Sell 11/07/14 11:06:17	SIM663853X	USDJPY	¥114.94	0.00	100000	(\$9.60)	(0.01%)
	Buy 11/07/14 11:22:02	SIM663853X	USDJPY	¥114.95			(\$9.60)	
2	Buy 11/07/14 11:23:12	SIM663853X	EURUSD	\$1.24	0.00	100000	\$101.00	0.08%
	Sell 11/07/14 12:12:57	SIM663853X	EURUSD	\$1.24		\$101.00	\$91.40	
3	Buy 11/07/14 11:47:05	SIM663853X	USDJPY	¥114.80	0.00	100000	(\$359.46)	(0.36%)
	Sell 11/07/14 13:40:46	SIM663853X	USDJPY	¥114.39			(\$268.06)	
4	Sell 11/07/14 14:00:01	SIM663853X	USDJPY	¥114.36	0.00	100000	(\$160.54)	(0.16%)
	Buy 11/07/14 15:00:01	SIM663853X	USDJPY	¥114.55			(\$428.59)	
5	Buy 11/14/14 11:06:43	SIM663853X	AUDJPY	¥101.65	0.00	100000	\$434.79	0.50%
	Sell 11/16/14 19:01:22	SIM663853X	AUDJPY	¥102.16		\$434.79	\$6.20	

	<b>All Trades</b>	<b>Long Trades</b>	<b>Short Trades</b>
Total Net Profit	\$6.20	\$176.33	(\$170.13)
Gross Profit	\$535.79	\$535.79	\$0.00
Gross Loss	(\$529.59)	(\$359.46)	(\$170.13)
Profit Factor	1.01	1.49	0.00

Overall performance For my overall performance this term I currently have 2 winners, 3 losers, and I am currently profitable by \$6.2. If my manual trade keeps working as it has been I feel like in the end I will stay profitable and have a at least 2.0 profit factor. Also I might have fixed my auto system, but I did not back test it yet you can the revision made in appendix c where I put the setstoploss function outside of any conditional block.

## Week 11/17-11/23

Analysis This week I will be looking at USDJPY only due to the news about the yen that has been circling around in the weekly meetings. Specifically I will be looking for long trades during the week since the overall consensus that I see about the USDJPY is that it going to keep rising unless the BOJ or Abe does something drastic change to strengthen the Yen.

Trade 1

-USDJPY 60 Minutes

-Long entry at 1 lot 50:1 leverage Market (117.715) 11/19/14 10:28:33 AM

-Exit due to limit at 118.764 at 11/20/14 02:06:38 AM

-Profit of \$887.64

Using the same manual strategy as last week (See Weekly Report 2 for details) I found another trade in the USDJPY pair that had both EMA moving in the direction that also bounced back from a subjective support line support line. For the past 3 trade using this strategy how many pips I should risk vs how many I should get for profit is the clear issue to figure out for the system. While in this trade I was able to reach the 100 pip profit in prior trades I have not been as lucky. If in the next 5 trades of this strategy I can't reach the 100 pip profit in any of them I might decide to revise the strategy with a lower profit target while also risking less money also.

Trade 2

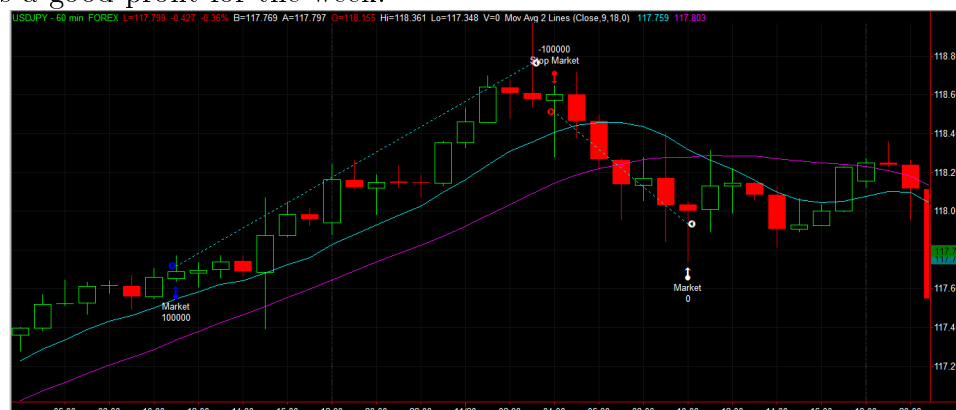
-USDJPY 60 Minutes

-Short entry 1 lot 50:1 leverage at 118.51 11/20/14 03:01:34 AM

-Exit at 117.932 11/20/14 09:25:31 AM

-Profit of \$488.81

This trade was an accident since Tradestation did not cancel my trailing stop order when my previous trade closed. So when it reached the trailing stop it activated and started a short position. I was asleep during this time and when I woke up I saw that I had a profit of \$200 at first so I decided to keep it going to see if I would get more. I decided to exit the trade at 117.932 since it made my total profit for the week be \$1376.45 which I felt was a good profit for the week.



#### TradeStation Performance Summary

[Collapse](#)

	All Trades	Long Trades	Short Trades
Total Net Profit	\$1,382.65	\$1,063.97	\$318.68
Gross Profit	\$1,912.24	\$1,423.43	\$488.81
Gross Loss	(\$529.59)	(\$359.46)	(\$170.13)
Profit Factor	3.61	3.96	2.87

Overall trades starting from 11/1

1	Sell 11/07/14 11:06:17	SIM663853X	USDJPY	¥114.94	0.00	100000	(\$9.60)
	Buy 11/07/14 11:22:02	SIM663853X	USDJPY	¥114.95			(\$9.60)
2	Buy 11/07/14 11:23:12	SIM663853X	EURUSD	\$1.24	0.00	100000	\$101.00
	Sell 11/07/14 12:12:57	SIM663853X	EURUSD	\$1.24		\$101.00	\$91.40
3	Buy 11/07/14 11:47:05	SIM663853X	USDJPY	¥114.80	0.00	100000	(\$359.46)
	Sell 11/07/14 13:40:46	SIM663853X	USDJPY	¥114.39			(\$268.06)
4	Sell 11/07/14 14:00:01	SIM663853X	USDJPY	¥114.36	0.00	100000	(\$160.54)
	Buy 11/07/14 15:00:01	SIM663853X	USDJPY	¥114.55			(\$428.59)
5	Buy 11/14/14 11:06:43	SIM663853X	AUDJPY	¥101.65	0.00	100000	\$434.79
	Sell 11/16/14 19:01:22	SIM663853X	AUDJPY	¥102.16		\$434.79	\$6.20
6	Buy 11/19/14 10:28:33	SIM663853X	USDJPY	¥117.72	6000.00	100000	\$887.64
	Sell 11/20/14 02:06:38	SIM663853X	USDJPY	¥118.76		\$887.64	\$893.84
7	Sell 11/20/14 03:01:34	SIM663853X	USDJPY	¥118.51	0.00	100000	\$488.81
	Buy 11/20/14 09:25:31	SIM663853X	USDJPY	¥117.93		\$488.81	\$1,382.65

## Week 11/23-11/30

Analysis I will be looking into USDJPY again and also at EURUSD for a trade using my manual system. This is due to the news and charts for the past week in both pairs. With the yen still being weak compared to the



dollar and the Euro not doing as well currently with their ECB issue. Trades  
No trades occurred this week due to Thanksgiving.

## Week 12/01-12/07

Analysis By using past weeks data I concluding the following will happen. While coming into December GBPUSD has been in a downward trend I believe this will reverse just due to the fact that no matter I find it hard to believe it will drop below 1.56 permanently since looking even further back this seem to be a pretty good absolute support level. So while I will look into GBPUSD for a trade I will continue looking at other currency pairs to see if any opportunity for a trade.

Trade 1

- GBPUSD 60 Minutes
- Long entry 1 lot 1.57567 12/01/14 01:12:20 PM
- Exit at 1.57061 12/02/14 02:15:02 AM
- Loss of \$506

This trade I entered using the same manual strategy I used in the prior weeks. This time the strategy did not generate profit. Being the only loss so far using this strategy I do not believe any changes have to be made to the strategy as whole yet. Since it should be expected that a will making a losing trade.



## Trade 2

- EURUSD 60 Minutes
- Entered at 1.22922 12/02/14 08:01:15 PM
- Exited at 1.23395 12/03/14 03:33:38 AM
- Loss of \$473

The rationale for this trade was simple support level strategy. Looking at the chart below I believed where I entered was a support level which if it was it would've went back up in price and I would have generated a profit. Now I was not a hundred percent sure this was a case so I set a trailing stop 50 pips below my entry in order to limit my loss if my prediction of what would happen was false. In the end I was wrong and the value of EURUSD continued to fall which activated my stop loss and I lost \$473 dollars.



	All Trades	Long Trades	Short Trades
Total Net Profit	\$403.14	\$84.46	\$318.68
Gross Profit	\$1,911.74	\$1,422.92	\$488.81
Gross Loss	(\$1,508.59)	(\$1,338.46)	(\$170.13)
Profit Factor	1.27	1.06	2.87

Overall Performance Overall I am satisfied with my results so far since I was expecting a losing week and my trailing stop kept me from going into the red overall.

## Week 12/08-12/18

Analysis Based on past weeks data I believe GBPUSD is going to be a good place to trade this coming week. Looking at its chart I saw a strong upward trend coming into this week starting at 12/8. I believe this trend will

continue but there will be spots in the market where people will believe they are overbuying and start selling causing some dips but then it will continue to be bullish.

#### Trade

- GBPUSD 60 minute
- Long Entry at 1.57001 12/10/14 10:51:34 AM
- Exit at 1.56882 12/10/14 11:33:52 AM
- Loss of \$119

This week I was continuing my manual system, but with a small change in the strategy. This change was that I was not setting my limit price at 100 pips above and I was not setting my trailing stop order at 50 pips below my entry. Instead I used 50 and 25 pips respectively. This change occurred since using the 100 and 50 pips method I only reached the 100 pip profit once even though I won four times using this strategy. So I decided to lower them by half with the reason that now I will reach my profit level more often. Looking back this might not have been the wisest decision since looking past the trade GBPUSD still continued an upward trend and if I was risking more I could've made profit. I will be trying 75 pips and 37.5 pips respectively next time.



#### Overall Performance

	All Trades	Long Trades	Short Trades
Total Net Profit	Total Net Profit	\$284	-\$35.46
Gross Product	Gross Product	\$1,911.74	1,422.92
Gross Loss	Gross Loss	\$1627.59	1457.46
Profit Factor	Profit Factor	1.17	0.97

Due to bugs in tradestation my log of trade has been corrupted so above in the table is the actual overall performance so far of my trading. Due to two week of constant losses though I nearing making no profit at all. In order to remedy this I plan on modifying my rules for my manual system. First, I will have three different pairs of limit order and trailing stops. One where I attempt for 100 pip while risking 50, another when I try for 50 and risk 25 pips, and lastly one where I try for 10 and risk 5 pips. In addition to

that I will use my previous day high and low indicator in addition to my current high and low of the day indicator in order to help pinpoint good support or resistance levels. Lastly I will make use of my currency strength indicator(Talked more about in B-Term Development Paper) in order to ensure I don't risk too much when the pair I am trading is too low.

## Week 1/16-1/25

Trades-USDCAD 70 minute

- Long Entry at 1.23762 01/21/15 13:33:28
- Exit at 1.23790 01/21/15 14:01:27
- Profit of \$22.69

To start the term I continued my manual strategy from last term, but I made use of my indicators, radarscreen, and the currency strength meter that was made last term. By using the currency strength meter I was able to limit which pairs I was looking for a trade in down to four. Which I then used my high low indicators, the Exponential moving average indicator, and a market pivot high/low indicator. From using these indicators with my manual system a trade in USDCAD occur since with that one large green bar I felt the previous day high line was fine as a support level. Once it was in the green by \$30 I reset the trailing to stop such that in the case I would break even. In the end I made \$22.69 by hitting my trailing stop.



### TradeStation Performance Summary

	All Trades	Long Trades	Short Trades
Total Net Profit	\$22.69	\$22.69	\$0.00
Gross Profit	\$22.69	\$22.69	\$0.00
Gross Loss	\$0.00	\$0.00	\$0.00
Profit Factor	n/a	n/a	n/a

#	Type	Date/Time	Account	Symbol	Price	Roll Over Pips	Shares/Ctrts/Units	Net Profit
1	Buy	01/21/15 13:33:28	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69
	Sell	01/21/15 14:01:27	SIM663853X	USDCAD	\$1.24			\$22.69

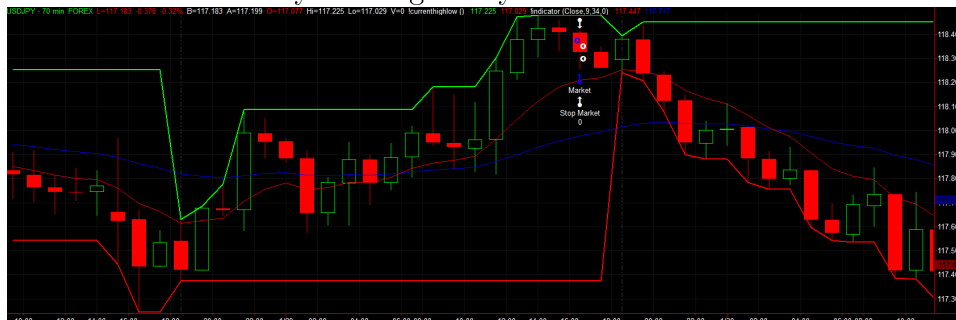
## Week 1/25-2/5

This week I made a new indicator that works for radarscreen or chart analysis in Tradestation, the code for this can be seen in the appendix. It tells the user if the asset being watched is overbought or oversold which is a good indicator to have using my strategy. I found this indicator by reading Tradestation analysis concepts section which explained how to make this indicator in detail. The reason this was made was to help me in ensuring when I enter the market that it has been close to a support or resistance level which my trading strategy depends on.

Trade-USDJPY 70 minute

- Short Entry at 118.345 01/29/15 15:16:06
- Exit at 118.297 01/29/15 15:20:05
- Profit of \$40.58

Using the currency strength indicator and the radarscreen I made I was able to filter my search for which currency pairs to trade. In the end I chose USDJPY to trade this week since it reached a new high of the day and then starting going down in value after that. This was good indication that it hit a resistance level. With this I wanted to enter a short trade, but a human error on my part made me enter a long position first which I close immediately and made my short position. I was aiming at 50 pip profit while risking 25 pips as a trailing stop. When it reached \$60 dollars in profit I reduced the trailing stop to ensure a profit of \$20 would be secured. Looking back on this trader and last trade I broke my rules by changing the trailing stop. I could have made more by sticking to my rules.



1	Buy 01/21/15 13:33:28	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69	0.02%	\$22.69	100.00%	100.00%	\$0.00
	Sell 01/21/15 14:01:27	SIM663853X	USDCAD	\$1.24			\$22.69		\$0.00	100.00%	100.00%	\$0.00
2	Buy 01/29/15 15:15:07	SIM663853X	USDJPY	¥118.37	0.00	100000	(\$20.29)	(0.02%)	\$89.61	81.54%		\$0.00
	Sell 01/29/15 15:15:47	SIM663853X	USDJPY	¥118.35			\$2.40		(\$20.29)	0.00%	(18.46%)	\$0.00
3	Sell 01/29/15 15:16:06	SIM663853X	USDJPY	¥118.35	0.00	100000	\$40.58	0.04%	\$40.58	26.23%		\$0.00
	Buy 01/29/15 16:02:23	SIM663853X	USDJPY	¥118.30			\$42.98		(\$114.16)	100.00%	26.23%	\$0.00

#### All Trades Long TradesShort Trades

Total Net Profit	\$42.98	\$2.40	\$40.58
Gross Profit	\$63.27	\$22.69	\$40.58
Gross Loss	(\$20.29)	(\$20.29)	\$0.00
Profit Factor	3.12	1.12	n/a

## Week 2/5-2/12

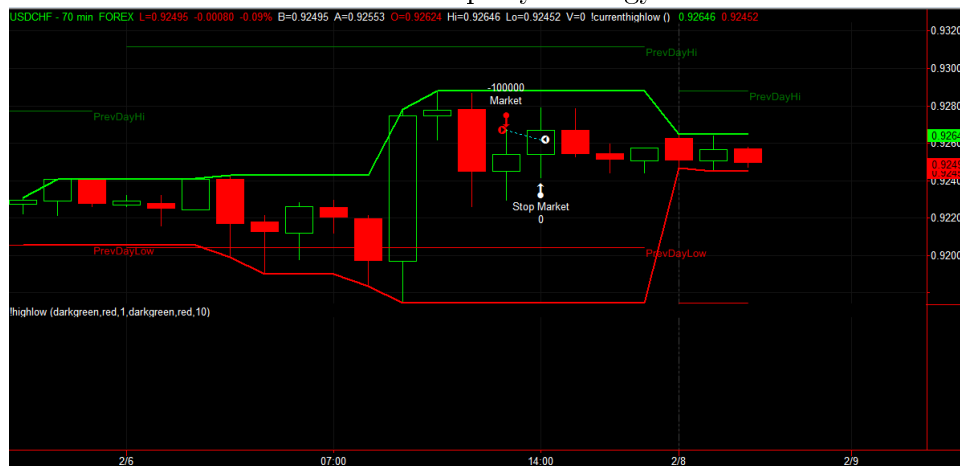
Trade-USDCHF 70 minute

-Short Entry at 0.92671 02/06/15 12:16:06

-Exit at 0.92617 02/06/15 13:11:05

-Profit of \$58.28

The trade this week once again made use of focusing on the two strongest currency pairs at the time which this week when I was trading was the USDCHF and the GBP NZD. I entered this trade because my indicators showed that it had reached a resistance level. Which at the time it held true and I was at a larger profit but then it came back up and hit my trailing stop. I believe my strategy would work better going for small wins over larger wins which means I probably will aim for 25 pip profit and risk 12 pips in the next week in order to see if this would help my strategy.



#### All Trades Long TradesShort Trades

Total Net Profit	\$101.25	\$2.40	\$98.86
Gross Profit	\$121.55	\$22.69	\$98.86
Gross Loss	(\$20.29)	(\$20.29)	\$0.00
Profit Factor	5.99	1.12	n/a

1	Buy 01/21/15 13:33:28	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69	0.02%	\$22.69	100.00%	\$0.00
	Sell 01/21/15 14:01:27	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69		\$0.00	100.00%	\$0.00
2	Buy 01/29/15 15:15:07	SIM663853X	USDJPY	¥118.37	0.00	100000	(\$20.29)	(0.02%)	\$89.61	81.54%	\$0.00
	Sell 01/29/15 15:15:47	SIM663853X	USDJPY	¥118.35			\$2.40		(\$20.29)	0.00%	\$0.00
3	Sell 01/29/15 15:16:06	SIM663853X	USDJPY	¥118.35	0.00	100000	\$40.58	0.04%	\$40.58	26.23%	\$0.00
	Buy 01/29/15 16:02:23	SIM663853X	USDJPY	¥118.30			\$42.98		(\$114.16)	100.00%	\$0.00
4	Sell 02/06/15 12:16:21	SIM663853X	USDCHF	Fr.0.93	0.00	100000	\$58.28	0.06%	\$58.28	20.61%	\$0.00
	Buy 02/06/15 13:11:28	SIM663853X	USDCHF	Fr.0.93			\$58.28		(\$224.68)	100.00%	\$0.00

## Week 2/12-2/19

This week I started optimizing my overbought and oversold condition of my strategy. The most important fact I wanted to get out of this initial optimization was the best time frame to be using on this system. I already had some by not even attempting to test it on weekly or greater or lower than 30 minute bars. I did this on the basis that I do not feel comfortable with them when trading manually and so I will not use them in auto-trading. So I testing this strategy on multiple stocks/currency pairs with the same parameters then changed them one by one to seeing what works the best. I did not use Tradestation's optimizer since I did not want to curve fit my strategy to one asset.

The results were slightly expected. Due to the fact that the longer the timeframe the better the results it had. What surprised me was that it even applied to currency pairs that basically been trending for a while like the USDJPY. The most important thing was that even at the lower of the limit and stop order values the strategy worked better on the longer time frame when it would auto exit next bar.

Another optimization that occurred was changed the target profit and max loss level. I did not test with trailing stops since I purposely wanted to test with worse case scenarios. I first started with aiming for 20 and risking 7.5 pips since I was never able to hit 50 risking 25 pips ever. This showed good profit, but on the bigger time frame which worked better it was pointless since it would just auto exit next bar. But in the end 50 risking 25 worked best on the higher time frames. Lastly, the strategy worked consistent across stocks and currency pairs on the daily aiming for 50 pips risking 25 pips.

## Week 2/19-2/26

This week was testing of the final code of the support resistance part of our system of systems. It included some changes from prior week. Specifically I now use Tradestation's settargetprofit and setdollartrailing functions for my exit strategies. The value I am using now are aiming for \$500 and risking \$100. But this might change when the final system of systems is complete.

I also added a new piece to the code that limit the number of consecutive long or short trades to 9. I did this to limit losses since if the asset was trending it would keep buying in the opposite way believe it would act the opposite. I did not set it to only allow one long then wait for a short since in directionless this might not happen. So I made this change in order to help minimize loss in case our system of systems decides to use this strategy believing a directionless strategy is better when a trending one in reality works best.

In the appendices one can see that I tested this final edition vs another support and resistance strategy the Relative Strength index on both EU-RUSD(a pair know to be mostly downward trending in the past year) and GBPCAD(a somewhat directionless pair in the last year) in order to see if the strategy I made was any good. Based on the results it did better in both cases without limiting the number of consecutive number of longs or shorts and limiting them. My strategy even worked better on both the 6 hour time-frame and daily timeframe. Based on the results it seems that the 6 hour time frame is the best for pure profit but for win percentage and minimizing number of consecutive losers daily is better.

Trade-GBPCAD 70 minute

-Short Entry at 1.92753 02/20/15 13:01:56

-Exit at 1.92991 02/06/15 13:10:43

-Loss of \$189.86

This week I entered into GBPCAD because my Overbought Oversold indicator gave me a value of 0.98 which means it is consider overbought so a short would be the best option. So I entered short and set my trailing stop to 25 pips. This trade was a good example of how an asset starting to trend can mess my strategy up.

				<b>All Trades Long TradesShort Trades</b>			
Total Net Profit				(\$88.61)	\$2.40	(\$91.01)	
Gross Profit				\$121.55	\$22.69	\$98.86	
Gross Loss				(\$210.16)	(\$20.29)	(\$189.86)	
Profit Factor				0.58	1.12	0.52	
1	Buy 01/21/15 13:33:28	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69
	Sell 01/21/15 14:01:27	SIM663853X	USDCAD	\$1.24		\$22.69	\$22.69
2	Buy 01/29/15 15:15:07	SIM663853X	USDJPY	¥118.37	0.00	100000	(\$20.29)
	Sell 01/29/15 15:15:47	SIM663853X	USDJPY	¥118.35		(\$20.29)	\$2.40
3	Sell 01/29/15 15:16:06	SIM663853X	USDJPY	¥118.35	0.00	100000	\$40.58
	Buy 01/29/15 16:02:23	SIM663853X	USDJPY	¥118.30		\$40.58	\$42.98
4	Sell 02/06/15 12:16:21	SIM663853X	USDCHF	Fr.0.93	0.00	100000	\$58.28
	Buy 02/06/15 13:11:28	SIM663853X	USDCHF	Fr.0.93		\$58.28	\$101.25
5	Sell 02/20/15 13:01:56	SIM663853X	GBPCAD	\$1.93	0.00	100000	(\$189.86)
	Buy 02/20/15 13:03:41	SIM663853X	GBPCAD	\$1.93		(\$189.86)	(\$88.61)





## Week 2/26-3/5

This week was more optimization because I wanted to test two major things. The priority was testing a higher target profit. The other was separate optimization for stocks compared to currency pairs. So first I tested them all with the following input: barsback=14, ADXval=30, Overboughtlvl=0.84 (Constant in all to avoid over fitting), Oversoldlvl=0.131 (constant in all to avoid over-fitting), targetprofit=1500 and maxloss =180. The assets being tested were GBPCAD, EURUSD, and AAPL these were chosen based on the previous tests and also the fact that AAPL is what Tom's strategy works best on so far so I wanted to get this to work as best as possible. They were tested on the daily chart from 1/1/11 to 1/1/14 so I could test later on current data.

During the initial testing short trade were doing the worse so I thought to lower the limit of consecutive short trades from 9 to 7. When doing so the profit factor of the short trades rose. So I then tested to see if lower long trade limit to 7 consecutive would also help which it did not. I feared change the number of consecutive short trades to be lower than 7 fearing I would be over fitting so I kept it as 7 since I did see improvement. Next I testing these with walk forward optimization which would change the input variables. For GBPCAD it changed the maxloss to 75 and when the walk forward analysis was done it passed. For EURUSD it changed the maxloss to 75 also and it also passed the walk forward, on AAPL it changed barsback to 8, ADXval to 28 and maxloss to 100. Which generate a nice backtest report, but when it was walk forwarded it failed. I at first was worried about this but then I decided to use these optimized input and test them from 1/1/14 to the present to see how they fare to present data.

In all three cases profits were made, but AAPL and EURUSD were still

doing really badly in the short trades. It's from this that I believe in cases where you are basically certain a certain trend will continue it is wise to turn off trade that opposes that trend for the given asset.

Trade 1 -EURUSD 180 minute chart

- Long Entry at 1.12021 02/26/15 14:00:00
- Exit at 1.11949 02/26/15 14:16:11
- Loss of \$72

Trade 2 - EURUSD 180 minute chart

- Long Entry at 1.12004 02/26/15 15:03:03
- Exit at 1.11935 02/26/15 15:17:07
- Loss of \$69

Trade 3 - GBPUSD 240 minute Chart

- Long Entry at 1.54085 02/26/15 15:03:05
- Exit at 1.54060 02/26/15 15:07:39
- Loss of \$24.98

This week I was trading using my automatic code that I made that require the ADX to be less than 30 in order to trade. I did not care for performance at all for these trade I just wanted to be sure the trailing stop code work as intended in non-back testing as it did in back testing. So when these three trades occurred and I checked to make sure they followed how it was coded I stop the system from trading since I was still optimizing and doing walk forwards.





										All Trades		Long Trades	Short Trades
Total Net Profit										(\$254.60)	(\$163.59)	(\$91.01)	
Gross Profit										\$121.55	\$22.69	\$98.86	
Gross Loss										(\$376.14)	(\$186.28)	(\$189.86)	
Profit Factor										0.32	0.12	0.52	
1	Buy	01/21/15	13:33:28	SIM663853X	USDCAD	\$1.24	0.00	100000	\$22.69	0.02%	\$22.69		
	Sell	01/21/15	14:01:27	SIM663853X	USDCAD	\$1.24		\$22.69	\$22.69		\$0.00		
2	Buy	01/29/15	15:15:07	SIM663853X	USDJPY	¥118.37	0.00	100000	(\$20.29)	(0.02%)	\$89.61		
	Sell	01/29/15	15:15:47	SIM663853X	USDJPY	¥118.35		(\$20.29)	\$20.40		(\$20.29)		
3	Sell	02/19/15	14:16:06	SIM663853X	USDJPY	¥118.35	0.00	100000	\$40.58	0.04%	\$40.58		
	Buy	01/29/15	16:02:23	SIM663853X	USDJPY	¥118.30		\$40.58	\$42.98		(\$114.16)		
4	Sell	02/06/15	12:16:21	SIM663853X	USDCHF	Fr.0.93	0.00	100000	\$58.28	0.06%	\$58.28		
	Buy	02/06/15	13:11:28	SIM663853X	USDCHF	Fr.0.93		\$58.28	\$101.25		(\$224.68)		
5	Sell	02/20/15	13:01:56	SIM663853X	GBPCAD	\$1.93	0.00	100000	(\$189.86)	(0.12%)	\$0.00		
	Buy	02/20/15	13:03:41	SIM663853X	GBPCAD	\$1.93		(\$189.86)	(\$88.61)		(\$189.86)		
6	Buy	02/26/15	14:00:00	SIM663853X	EURUSD	\$1.12	0.00	100000	(\$72.00)	(0.06%)	\$0.00		
	Sell	02/26/15	14:16:11	SIM663853X	EURUSD	\$1.12		(\$72.00)	(\$160.00)		(\$160.00)		
7	Buy	02/26/15	17:03:05	SIM663853X	GBPUSD	\$1.54	0.00	100000	(\$24.98)	(0.02%)	\$24.92		
	Sell	02/26/15	17:07:39	SIM663853X	GBPUSD	\$1.54		(\$24.98)	(\$185.60)		(\$24.98)		
8	Buy	02/26/15	17:03:03	SIM663853X	EURUSD	\$1.12	0.00	100000	(\$69.00)	(0.06%)	\$439.00		
	Sell	02/26/15	17:17:07	SIM663853X	EURUSD	\$1.12		(\$69.00)	(\$254.60)		(\$69.00)		

and I debated whether to sell off the units I had purchased. I decided to hold on to the units until I saw the value continuously decrease. Around 1:00pm the value dropped briefly, giving me a profit of around \$20. Then the value shot up drastically and my profit was around \$60. Still, I decided to hold on to my purchases rather than exit the market.

After that decision, the price fell again to hover around \$1.62776. This is when I chose to exit the market because I felt that the price had peaked and was going to go down for the rest of the day.

## Journal 2

This week I read the following two articles covering events that may affect the forex market: "French private sector output falls further in September" and "China - "PBOC head's departure wouldn't necessarily signal policy shift". The first article about France talks about how the Purchasing Managers Index (PMI), which is an indicator of the economic health of the manufacturing sector, is experiencing its 5th consecutive month of decline. In addition employment is continuing to fall, carrying on an 11 month trend of job shedding. The other article talked about how China's monetary policy would not change even though the head of the PBOC, Zhou Xiaochuan, has departed. The article linked a Wall Street Journal article which stated that Xiaochuan's probable successor is also a reformer and would in general continue the trend which the former head has set.

This week I chose to trade in the GBPUSD because it appeared to be doing well. I bought 100,000 units around 10:00pm on the 23 of September at a price of 1.64078. It quickly became clear however, that the market was not going to act in my favor. The price steadily dropped between the 23rd and the 24th, falling to a price of 1.63276, giving me a loss of \$802. I therefore decided to exit the market at that loss. This chart shows the market roughly between when I bought in and exited the market.



### Journal 3

This week I read two articles, "US Week Ahead: NFP, ISM, Trade Balance, PCE Deflator, Factory Orders, Cons Conf, Housing" and "AUD/USD Forecast Sep. 29-Oct. 3". The US Week ahead talked about the PCE for August, YoY growth, home sales, Consumer Confidence Index, PMI, construction spending, light vehicle sales, durable goods and factory orders, the trade deficit, nonfarm payrolls, the ISM non-manufacturing index, and personal income.

The article said that the August PCE index likely fell 0.1% which pushed down the YoY growth to 1.4% which means that the financial performance fell between last year and this year. Pending home sales are expected to rise by 0.9% continuing growth since July, which indicates that more people are able to buy homes; however, mortgage applications fell by 1.7%. The consumer confidence index is expected to increase to 92.6; in addition stronger employment gains are expected.

The manufacturing PMI fell slightly from 59 to 58.6, which means that the economic health of the manufacturing sector fell slightly. Construction spending likely rose by 0.2% in August, but housing starts of single-units and housing completions both fell.

Light vehicle sales slowed to a 16.5 million unit annual rate, however the decline was smaller than in previous years. Due to a drop in durable goods orders, factory orders probably dropped by 9.1%. The trade deficit is probably going to fall to 39.4bn in August with a rise of exports by 0.1% and a fall of imports by 0.5%.

Nonfarm payrolls likely rose by a 215k gain and the unemployment rate is expected to hold at 6.1%, while average hourly earnings have continued to

rise and the average weekly hours are expected to remain the same. Personal income likely rose by 0.3% in August and personal spending increased as well by 0.4%. The ISM non-manufacturing index probably fell from a record high to a respectable reading of 59, which means that stock markets should decrease due to lower corporate profits.

The other article talked about how the Australian dollar continues to slump, with private sector credit, AIG manufacturing index, commodity prices, and HIA new home sales all falling. However, Australia's deficit is expected to decrease from 1.36 billion to .78 billion, the Chinese manufacturing PMI is continuing to grow, retail sales is increasing, and the Chinese HSBC final manufacturing PMI is still in growth mode.

Two strategies that I learned from babypips.com were: Using a Fibonacci Retracement to know when to enter a trade, and how to use momentum indicators to confirm a trend.

The Fibonacci strategy uses the Fibonacci tool to find the recent significant Swing Highs and Swings Lows. For uptrends, you find the swing low and then find the most recent swing high. For downtrends you find the swing high and then find the most recent swing low. To apply the uptrend method, you find a price which does not go below the Fibonacci retracement level and buy in at that price. For downtrends, you find a price which does not go above the Fibonacci retracement and sell at that point.

The momentum indicator strategy uses MACD and moving averages to spot trends in the market. If the 10 EMA crosses above the 20 EMA and the MACD makes an upward crossover, this produces a buy signal. If the 10 EMA crosses below the 20 EMA and the MACD makes a downward crossover, this produces a sell signal. However, a fakeout can occur if the MACD makes a downward or upward crossover but the EMA's don't cross.

This week I decided to trade in the AUDUSD market since it was achieving its highs and lows at roughly the same times. I bought 100,000 units at a price of .86785 on Tuesday, September 30 at 10:29pm, which was roughly around the time when the AUD reaches its minimum value. I then kept the units until 8am of October 1, which was roughly when the AUD peaks for the day. I didn't sell the units until around 8:41am because the market still appeared to be rising. At 8:41am, I finally decided to exit the market at a price of .87145 for a profit of \$360.



## Journal 4

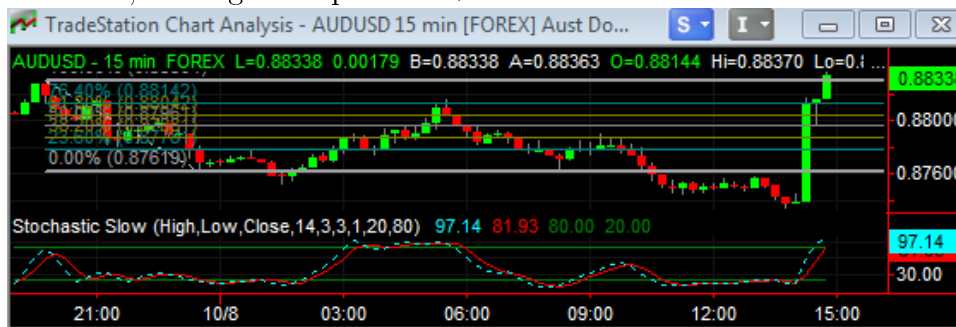
This week, I took a look at two articles: "Minutes of the Federal Open Market Committee" and "Preview: Expect Big Revisions to Australian Labor Market Data".

The first article, "Minutes of the Federal Open Market Committee", covered the meeting of the FOMC. The committee decided to leave the federal funds rate alone until the economic situation improves. During the normalization period, the Federal Reserve intends to move the federal funds rate into the target range set by the FOMC and use an overnight reverse repurchase agreement facility and other supplementary tools to control the federal funds rate. The Committee will also use an overnight reverse repurchase agreement facility until it is no longer needed to help control the federal funds rate.

The other article talked about how the Australian labor market is expected to do better than what was projected. It says that the September data is likely to be affected sharply because there is a possibility that the underlying trend of an employment rise of 0.9% over the year in the second quarter of this year may be able to be extrapolated into the third quarter. This would imply that there will be an increase of 29,000 new jobs compared to the market consensus expecting a drop of 30,000.

This week I chose to trade AUDUSD because the market was operating roughly the same every day. I set up Fibonacci retracement lines to help me know when to buy in on October 7, 2014. I decided to buy a standard lot at a price of .87966 per unit at 10:03pm. The market then proceeded to operate roughly within the retracement lines. I decided to leave the order open till morning, where most of the market activity happens. In the morning I discovered that the market was actually falling rather than rising during this time period, giving me a loss exceeding \$400. I was not discouraged however, since the Federal Open Market committee was scheduled to meet

from 11:00am October 7th to 9:00am on October 8th with an accompanying article that was due to be released at 2:00pm on the 8th. I decided to keep the order open until the article was released. Around the time the article was available, the market shot up, and I exited the market at 2:47pm at a price of .883, netting me a profit of \$334.



## Journal 5

I decided to buy into the AUDUSD market on October 14, 2014. I bought a standard lot at .87236 per share. I chose to buy in before the SlowK stochastic line crossed above the SlowD stochastic line. I watched the market carefully because I wanted to leave the market as soon as I made an okay profit, since I did not expect the market to keep growing. After the SlowK crossed above the SlowD stochastic line I waited a little longer before selling to see if the SlowK line was going to go even higher. I sold the shares at a price of .87321 per share for a profit of \$85 when the slope of the SlowK line appeared to remain close to the SlowD line.





## Journal 6

I decided to buy into the NZDUSD market on October 14, 2014, 11:29pm at a price of .78474 when the SlowK line was below the SlowD line. I decided to keep the order open overnight while I waited for the market to go back up again. The next day the market was growing again. I decided to wait until the SlowK line looked like it was going to go below the SlowD line. When it did, I sold the shares at a price of .79082 for a profit of \$608.



## Journal 7

This past week, I experimented with stochastics by trading EURUSD. I entered the market late on Wednesday, November 5th at a price of 1.25253. I decided to look at upcoming news for the forex market. I saw that there was an ECB press conference scheduled for the next day. It was high impact so I decided to leave the market as soon as I got a profit. I sold at a price of 1.25284 for a gain of \$31. The next day, at approximately 9:00am, the EURUSD market dropped sharply to a price of 1.24072 per unit. This week, I read two high impact news articles relating to the forex market, which were: the U.S unemployment insurance weekly claims and "Euro Sinks as Draghi Sticks to Script". The unemployment insurance weekly report discussed how the seasonally adjusted insured unemployment during the week ending on October 25 was 2,348,000, which is a decrease of 39,000 from the previous week. This is the lowest level it has ever been since December of 2000, where it was 2,340,000. <http://www.workforcesecurity.doleta.gov/press/2014/110614.pdf> The other article talked about the ECB meeting, in which the ECB president Draghi discussed how the ECB was going to move its balance sheet to 2012 levels. As a result of this announcement, the Euro fell sharply, but later

rallied the next day. <http://www.marctomarket.com/2014/11/euro-sinks-as-draghi-sticks-to-script.html>

## Journal 8

This week I prepared four trades to sell next week. I decided to trade AUDJPY, EURJPY, GBPJPY, and USDJPY. I bought in at 102.310, 146.455, 183.241, and 116.935 per unit respectively. I also chose two articles of interest: "Week in FX Americas - Bullard and G20 Beat Down Dollar" and "Japan Q3 GDP unexpectedly shrinks, Abe seen delaying tax hike". The first article talked about how American consumers are feeling confident about the nation's economy, which caused a jump in the Thomson Reuters/University of Michigan sentiment index to a seven year high. It also mentioned that the price of energy will be a major game changer for this sentiment. The article then went on to say that even though the U.S sales print was solid, it only briefly reached a seven-year high against the yen. , while the EURUSD spreads was having trouble widening. However, with the Treasury prices falling, U.S yields increased which made the dollar more attractive. Then, the president of the Federal Reserve Bank of St. Louis, James Bullard expressed his worries about the impact of a gradual U.S rate hike. With wages being a lagging indicator for inflation, he said that he does not expect to see a surge in wage gains. These statements meant that traders holding long positions want to get rid of them before the G-20 meeting. This "has diminished all the good that U.S sales data was able to do for the dollar. <http://www.marketpulse.com/20141114/week-fx-americas-bullard-beats-dollar/> The other article discussed how Japan's economy unexpectedly shrunk by 1.6% in July-September following a severe contraction in the previous quarter. The "preliminary figure for the GDP compared with a 2.1% increase forecast by economists in a Reuters poll. It followed a revised 7.3% contraction in the second quarter, which was the biggest slump since the March 2011 earthquake and tsunami...". On the quarter by quarter basis, the economy shrunk by 0.4% in the third quarter. <http://www.reuters.com/article/2014/11/16/japan-economy-gdp-idUST9N0SV00D20141116>

## Journal 9

This week I decided to trade AUDJPY, EURJPY, GBPJPY, and USDJPY. I entered all four markets on Sunday, November 16th, 2014 because all of them were trending upwards. I bought in at 102.310, 146.455, 183.241, and 116.935 per unit respectively. Not long after buying into these markets, a news article, (discussed in report 2) came out which said that the Japanese economy was in decline. This caused all four markets to decline sharply, however, because the bank of Japan was due to talk on Wednesday. I sold all 4 for profits of \$155.11 for USDJPY, \$180.45 for EURJPY, \$1012 for GBPJPY, and \$82.38 for AUDJPY.

This week I looked at two articles, "Statement on Monetary Policy" and "November Manufacturing Business Outlook Survey". The first article, released by the bank of Japan on Wednesday the 19th, talked about how the bank will "conduct money market operations so that the monetary base will increase at an annual pace of about 80 trillion yen". The bank also resolved to follow the following guidelines: they will purchase exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs) in order to increase at annual paces of 3 trillion yen and 90 billion yen respectively; the bank will also maintain their amounts outstanding for CP and corporate bonds, at about 2.2 trillion yen and 3.2 trillion yen respectively. The document also mentioned that the Japanese economy has continued to improve moderately and is expected to follow this trend. [www.boj.or.jp/en/announcements/release\\_2014/k141119a.pdf](http://www.boj.or.jp/en/announcements/release_2014/k141119a.pdf)

The second article talked about how regional manufacturing activity has increased by a noticeable amount in November. In addition, broad indicators for new orders and shipments showed similar improvement, responding firms indicated that employment was higher and the broadest indicator of future activity suggests that firms should expect growth to continue over the next six months. <http://www.phil.frb.org/research-and-data/regional-economy/business-outlook-survey/2014/bos1114.cfm>

## Journal 10

This week I decided to trade GBPUSD and EURUSD because the Pound and the Euro appeared to be strengthening on Tuesday. I attempted to buy into both markets at the lowest prices on Tuesday with the intent to sell either of them later in the week. I saw that an important article for the British

pound was going to come out on Wednesday. The next day I saw that I had a profit of 435.84, so I decided to exit the market. The EURUSD market however was netting me a loss. But I decided to keep the position open until Friday since there were articles due to come out every day until that Friday, one of which forecasted a slightly weaker US dollar. By Friday, I was up by \$407, so I exited the market. I looked at two articles this week, "UK service sector growth strengthens" and "U.S. international trade in goods and services October 2014". The first article talks about how the services sector for the U.K continues to strengthen. According to November's survey of the UK service sector, activity growth strengthened among reports of firm demand and rising volumes of new business. Capacity has therefore continued to remain under pressure which has led to an increase in work outstanding. This increase has caused companies to add to their payroll numbers. An elevated rate of employment growth in November also displayed positive company expansion plans and business confidence in the total service sector has remained high. <http://www.markiteconomics.com/Survey/PressRelease.mvc/c5ca3e98654d444d8c2026c74987e333> The second article talks about how the U.S goods and services deficit fell \$0.2 billion from September. In addition October exports increased by \$2.3 billion since September and imports increased as well by \$2.1 billion since September. However, year-to-date the goods and services deficit has increased by \$20.5 billion, or 5.1 percent, from the same period in 2013. <http://bea.gov/newsreleases/international/trade/2014/pdf/trad1014.pdf>

## Journal 11

This week I decided to trade GBPUSD and EURJPY because according to the news forecast for the week, both the GBP and EUR appeared to be strengthening and the JPY was weakening. I tried to buy in when the Slow K stochastic line looked like it was going to cross the Slow D line. I managed to sell both for profits of around \$400 for GBPUSD and around 100 for EURJPY, however trade station is missing the exact details for both trades. This week I looked at two articles, "UK trade deficit hits seven-month low" and "Japan consumer mood worsens for fourth straight month in November". The first article talks about how the UK's goods trade deficit has fallen its lowest level in seven months during October due to lower fuel imports and a slight rise in exports. The article reported that the ONS said that the drop in oil imports was the main driver for this decrease, which could possibly reflect the return to production in the North Sea, where maintenance hit output

over the summer. <http://uk.reuters.com/article/2014/12/10/britain-trade-idUKKBN0JO0TK20141210> The second article talked about how Japanese consumer confidence in November has continued to worsen for a fourth straight month. It also talked about how the survey's sentiment index for general households, which includes views on incomes and jobs, reached a value of 37.7 in November, the lowest since April. <http://www.reuters.com/article/2014/12/10/us-japan-economy-confidence-idUSKBN0JO0CG20141210>

## C.3 Thomas' Journal

### Week 1

During the first week I traded, the one trade I made was based more on random chance than on any real understanding of the market.



The strategy was rather simple, the EURUSD looked like it was in what I would now know is called a "non-trending" market, and as such I planned to enter when it was significantly above or below its average, and then exit when it turned around again.



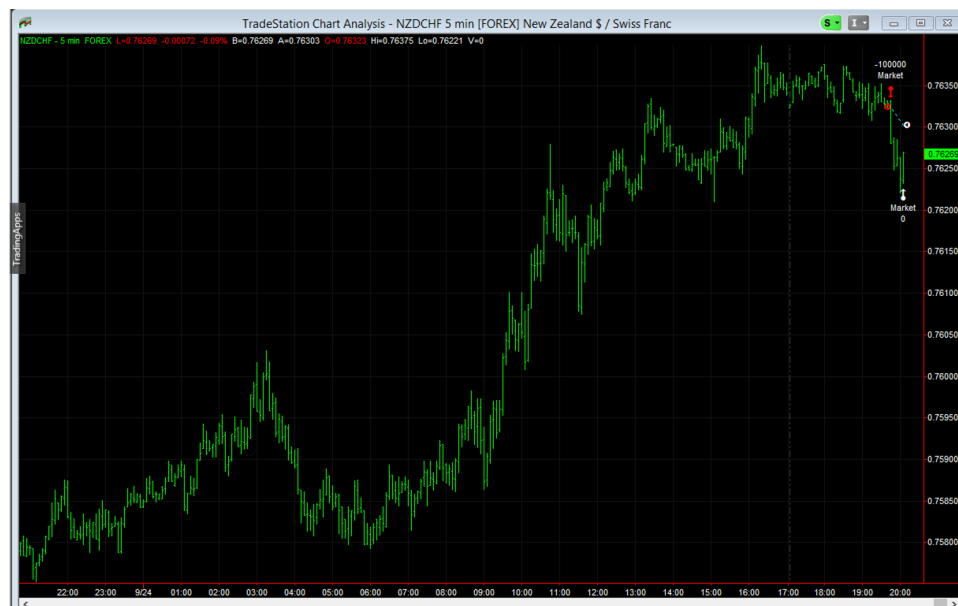
This worked out reasonably, though I only used a mini-lot at the beginning, as I was uncertain about the risk involved. The final position was a short one with eight dollars in profit.

## Week 2

In the second week I decided to use the Stochastic for S/R trading. This did not end as happily as I had hoped, since I didn't have as much of a plan as I should have had. I also didn't really check if the market was in a trend or not.

Entered	V	Filed/Canceled	Symbol	Spread	Type	Quantity	Qty Filled	Qty Left	Stop	Limit	Filed Price	Order Status	Route	Duration	Group Name	Triggered By	Advanced	Order#	Account	Originator	Commission	Contract Exp.
19/04/14 09:14:01 PM		19/04/14 09:14:01 PM	EURCHF		Buy	100,000	100,000	0		Market	1.29839	Filled	Day					1.29839	19/04/14	544745	\$0.00	
19/04/14 09:46:57 PM		19/04/14 09:46:57 PM	EURCHF		Sell	100,000	100,000	0		Market	0.89250	Filled	Day					1.29372	19/04/14	544745	\$0.00	
19/04/14 09:50:03 PM		19/04/14 09:50:03 PM	EURCHF		Buy	100,000	100,000	0		Market	0.90450	Filled	Day					1.29387	19/04/14	544745	\$0.00	
19/04/14 09:52:36 PM		19/04/14 09:52:36 PM	EURCHF		Buy	100,000	100,000	0		Market	0.76332	Filled	Day					1.29387	19/04/14	544745	\$0.00	
19/04/14 09:54:16 PM		19/04/14 09:54:16 PM	EURCHF		Sell	100,000	100,000	0		Market	0.76324	Filled	Day					1.29387	19/04/14	544745	\$0.00	
19/04/14 09:55:02 PM		19/04/14 09:55:02 PM	EURCHF		Sell	100,000	100,000	0		Market	1.29350	Filled	Day					1.29387	19/04/14	544745	\$0.00	

The first trade noted in my notes for the week was this one.



Now looking back on the trade in question, It appears that I got out too early, if I had held onto it for another hour or two I would probably have made quite a bit more on it.

The next trade I made that week was a losing trade, probably because the market was too volatile for s/r trading.



The final trade I made this week was another minor victory, mostly because I entered just before the turnaround from the trend.



## Week 3

In the third week I decided to trade a double moving average crossover strategy. At the time I decided to display 3 moving averages instead of the usual two. This appears to have confused my implementation of the strategy. I also attempted to trade on an extremely short timeframe. Neither the additional information, nor the short timeframe worked out terribly well for me.





Symbol Filter		Account No. 48										Status: All Orders		From	Today	To	Today	Refresh Data	
Entered	Filled/Canceled	Symbol	Spread	Type	Quantity	Qty Filled	Qty Left	Stop	Limit	Filled Price	Order Status	Route	Duration	Group Name	Triggered By	Advanced	Order#		
10/01/14 11:01:47 PM	10/01/14 11:01:47 PM	EURUSD		Sell	100,000	100,000	0		Market	1.26458	Filled		Day				3.3186-947		
10/01/14 11:00:45 PM	10/01/14 11:00:45 PM	EURUSD		Sell	100,000	100,000	0		Market	1.26452	Filled		Day				3.3186-948		
10/01/14 10:57:49 PM	10/01/14 10:57:49 PM	EURUSD		Buy	100,000	100,000	0		Market	1.26458	Filled		Day				3.3186-949		
10/01/14 10:56:47 PM	10/01/14 10:56:47 PM	EURUSD		Sell	100,000	100,000	0		Market	1.26444	Filled		Day				3.3186-950		
10/01/14 10:56:27 PM	10/01/14 10:56:27 PM	EURUSD		Sell	100,000	100,000	0		Market	1.26448	Filled		Day				3.3186-951		
10/01/14 10:54:07 PM	10/01/14 10:54:07 PM	EURUSD		Buy	100,000	100,000	0		Market	1.26411	Filled		Day				3.3186-952		
10/01/14 10:53:07 PM	10/01/14 10:53:07 PM	EURUSD		Buy	100,000	100,000	0		Market	1.26412	Filled		Day				3.3186-953		
10/01/14 10:52:49 PM	10/01/14 10:52:49 PM	EURUSD		Sell	100,000	100,000	0		Market	1.26360	Filled		Day				3.3186-954		

In the first trade I appear to have gotten confused as regards to which line color indicated the short and long moving averages, and by the time that I had reversed the position the market had moved significantly, losing almost half the profit from the move. For the remaining two trades, the market was not moving terribly much, probably due to the short timeframe, and neither one really did anything.

## Week 4

This week I decided to change the chart layout that I was using to a candlestick chart in order to attempt to trade based on the patterns covered in the reading for the previous week.

10/09/14 01:21:22 PM	10/09/14 01:21:23 PM	EURUSD		Buy		100,000		100,000		0		Market	1.26939	Filled
10/09/14 01:20:13 PM	10/09/14 01:20:14 PM	EURUSD		Sell		100,000		100,000		0		Market	1.26966	Filled
10/08/14 10:21:10 PM	10/08/14 10:21:10 PM	USDJPY		Buy		100,000		100,000		0		Market	108.095	Filled
10/08/14 10:10:28 PM	10/08/14 10:10:28 PM	NZDUSD		Buy		100,000		100,000		0		Market	0.79353	Filled
10/08/14 10:08:11 PM	10/08/14 10:08:11 PM	NZDUSD		Sell		100,000		100,000		0		Market	0.79354	Filled
10/08/14 09:58:26 PM	10/08/14 09:58:26 PM	EURUSD		Buy		200,000		200,000		0		Market	1.27357	Filled

For instance, here I noticed a "double top" signal suggesting a reversal, and moved to short the market.



## Week 5

This week I began moving my existing forex trading system into a stock trading system. No actual trades were executed, but several major code revisions were optimized on data.

## Week 6

I decided, based on the preceding week's strategy development, to run my system only on apple stock as it was the only stock that was consistently profitable in the technology sector for my strategy over all iterations and optimizations. I also only ran it on Friday evening, as that was the only period for which I could watch it continuously.



Symbol	Price	Units/Profit	Profit / net profit
AAPL	\$113.87	0.00	500 (\$680.00)
AAPL	\$112.53		(\$670.00) (\$680.00)
AAPL	\$113.90	0.00	500 \$1,420.00
AAPL	\$111.04		\$1,430.00 \$740.00

The system was manually exited at end of week, due to end-of-week jumps not being properly analyzed at this state.

## Week 7

This week was a logical continuation of the previous week's trading habits, and was predicated on their success. The system was run automatically, with a few manual exits early in the week until such were determined to be unnecessary.

**TradeStation Performance Summary** Collapse ^

	All Trades	Long Trades	Short Trades
Total Net Profit	\$460.00	\$690.00	(\$230.00)
Gross Profit	\$1,250.00	\$1,145.00	\$105.00
Gross Loss	(\$790.00)	(\$455.00)	(\$335.00)
Profit Factor	1.58	2.52	0.31

The system preformed admirably with fully automatic trading, managing to make a decent profit without any really major moves. Symbol | Price | Units/Profit | Profit / net profit

Account	Symbol	Price	Roll Over Pips	Shares/Ctrts/Units	Profit
AAPL	\$114.89	0.00	500	\$175.00	0.32%
AAPL	\$115.26		\$185.00	\$175.00	
AAPL	\$115.28	0.00	500	(\$135.00)	(0.22%)
AAPL	\$115.53		(\$125.00)	\$40.00	
AAPL	\$115.53	0.00	500	(\$330.00)	(0.55%)
AAPL	\$114.89		(\$320.00)	(\$290.00)	
AAPL	\$114.90	0.00	500	\$105.00	0.20%
AAPL	\$114.67		\$115.00	(\$185.00)	
AAPL	\$114.67	0.00	500	\$970.00	1.71%
AAPL	\$116.63		\$980.00	\$785.00	
AAPL	\$116.37	0.00	500	(\$155.00)	(0.25%)
AAPL	\$116.66		(\$145.00)	\$630.00	
AAPL	\$116.66	0.00	500	(\$125.00)	(0.20%)
AAPL	\$116.43		(\$115.00)	\$505.00	
AAPL	\$116.43	0.00	500	(\$45.00)	(0.06%)
AAPL	\$116.50		(\$35.00)	\$460.00	

## Week 8

TradeStation Performance Summary				Collapse ⌵
	All Trades	Long Trades	Short Trades	
Total Net Profit	\$1,440.00	\$1,210.00	\$230.00	
Gross Profit	\$1,590.00	\$1,250.00	\$340.00	
Gross Loss	(\$150.00)	(\$40.00)	(\$110.00)	
Profit Factor	10.60	31.25	3.09	
Roll Over Credit	\$0.00	\$0.00	\$0.00	
Open Position P/L	\$0.00	\$0.00	\$0.00	
Select Total Net Profit	\$1,440.00	\$1,210.00	\$230.00	
Select Gross Profit	\$1,590.00	\$1,250.00	\$340.00	
Select Gross Loss	(\$150.00)	(\$40.00)	(\$110.00)	
Select Profit Factor	10.60	31.25	3.09	
Adjusted Total Net Profit	\$538.93	(\$80.00)	(\$76.30)	
Adjusted Gross Profit	\$795.00	\$0.00	\$143.70	
Adjusted Gross Loss	(\$256.07)	(\$80.00)	(\$220.00)	
Adjusted Profit Factor	3.10	0.00	0.65	

As a continuation of the overall strategy this term, the auto-trader was run automatically on apple stock for the specified period.

Symbol | Price | Units/Profit | Profit / net profit

AAPL	\$116.66	0.00	500	\$1,250.00
AAPL	\$119.18		\$1,260.00	\$1,250.00
AAPL	\$119.18	0.00	500	\$190.00
AAPL	\$118.78		\$200.00	\$1,440.00
AAPL	\$118.68	0.00	500	\$110.00
AAPL	\$118.44		\$120.00	\$1,550.00
AAPL	\$115.61	0.00	500	\$40.00
AAPL	\$115.51		\$50.00	\$1,590.00
AAPL	\$115.51	0.00	500	(\$40.00)
AAPL	\$115.45		(\$30.00)	\$1,550.00
AAPL	\$115.45	0.00	500	(\$110.00)
AAPL	\$115.65		(\$100.00)	\$1,440.00

## Week 9

TradeStation Performance Summary				Collapse ^
	All Trades	Long Trades	Short Trades	
Total Net Profit	(\$1,391.00)	(\$1,105.00)	(\$286.00)	
Gross Profit	\$1,619.00	\$425.00	\$1,194.00	
Gross Loss	(\$3,010.00)	(\$1,530.00)	(\$1,480.00)	
Profit Factor	0.54	0.28	0.81	

For the first part of the week, the system was working well.

AAPL	\$119.18	0.00	500	\$190.00
AAPL	\$118.78		\$200.00	\$190.00
AAPL	\$118.68	0.00	500	\$110.00
AAPL	\$118.44		\$120.00	\$300.00
AAPL	\$115.61	0.00	500	\$40.00
AAPL	\$115.51		\$50.00	\$340.00
AAPL	\$115.51	0.00	500	(\$40.00)
AAPL	\$115.45		(\$30.00)	\$300.00
AAPL	\$115.45	0.00	500	(\$110.00)
AAPL	\$115.65		(\$100.00)	\$190.00
AAPL	\$114.08	0.00	500	(\$85.00)
AAPL	\$114.23		(\$75.00)	\$105.00
AAPL	\$114.32	0.00	500	\$854.00
AAPL	\$112.59		\$864.00	\$959.00
AAPL	\$112.46	0.00	500	(\$65.00)
AAPL	\$112.57		(\$55.00)	\$894.00

However, the system broke down Tuesday morning with a very large intraday trading loss

AAPL	\$112.57	0.00	500	(\$1,220.00)
AAPL	\$110.15		(\$1,210.00)	(\$326.00)
AAPL	\$110.16	0.00	500	(\$635.00)
AAPL	\$111.41		(\$625.00)	(\$961.00)
AAPL	\$111.31	0.00	500	(\$315.00)
AAPL	\$111.92		(\$305.00)	(\$1,276.00)
AAPL	\$111.92	0.00	500	(\$65.00)
AAPL	\$111.81		(\$55.00)	(\$1,341.00)
AAPL	\$111.74	0.00	500	(\$55.00)
AAPL	\$111.65		(\$45.00)	(\$1,396.00)
AAPL	\$112.00	0.00	500	(\$45.00)
AAPL	\$111.93		(\$35.00)	(\$1,441.00)
AAPL	\$112.02	0.00	500	(\$45.00)
AAPL	\$111.95		(\$35.00)	(\$1,486.00)

The system was repaired at the end of the week, and then proceeded to trade. It managed to score some minor profits during this period, but not enough to make up for the losses occurred with the break.

AAPL	\$110.91	0.00	500	(\$75.00)
AAPL	\$111.04		(\$65.00)	(\$1,621.00)
AAPL	\$111.14	0.00	500	(\$75.00)
AAPL	\$111.27		(\$65.00)	(\$1,696.00)
AAPL	\$111.27	0.00	500	\$245.00
AAPL	\$111.78		\$255.00	(\$1,451.00)
AAPL	\$111.78	0.00	500	(\$120.00)
AAPL	\$112.00		(\$110.00)	(\$1,571.00)
AAPL	\$112.10	0.00	500	\$180.00
AAPL	\$112.48		\$190.00	(\$1,391.00)